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AMERICAN GAS JOURNAL

Established 1853 Pioneer of the Gas Industry

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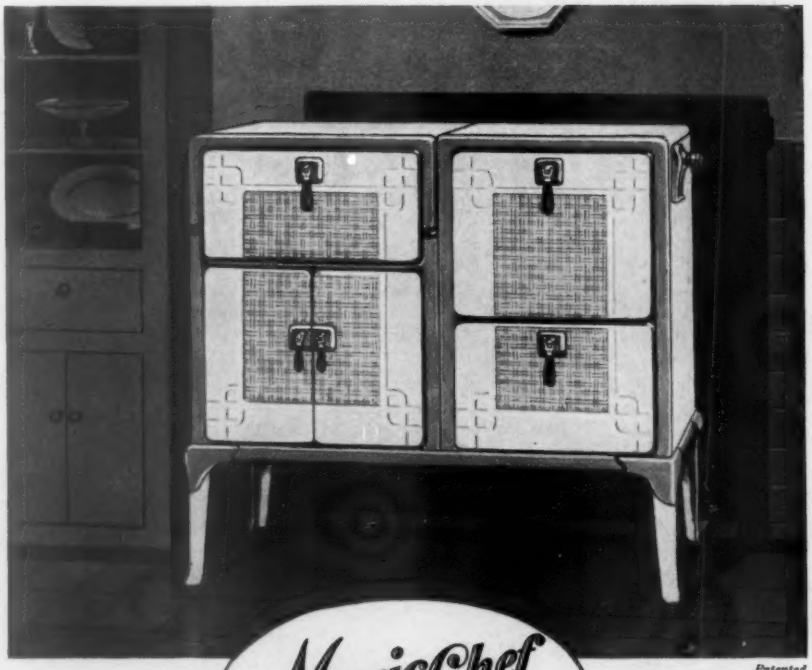

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Established 1859 *Pioneer of the Gas Industry*

Manufactured and Natural Gas

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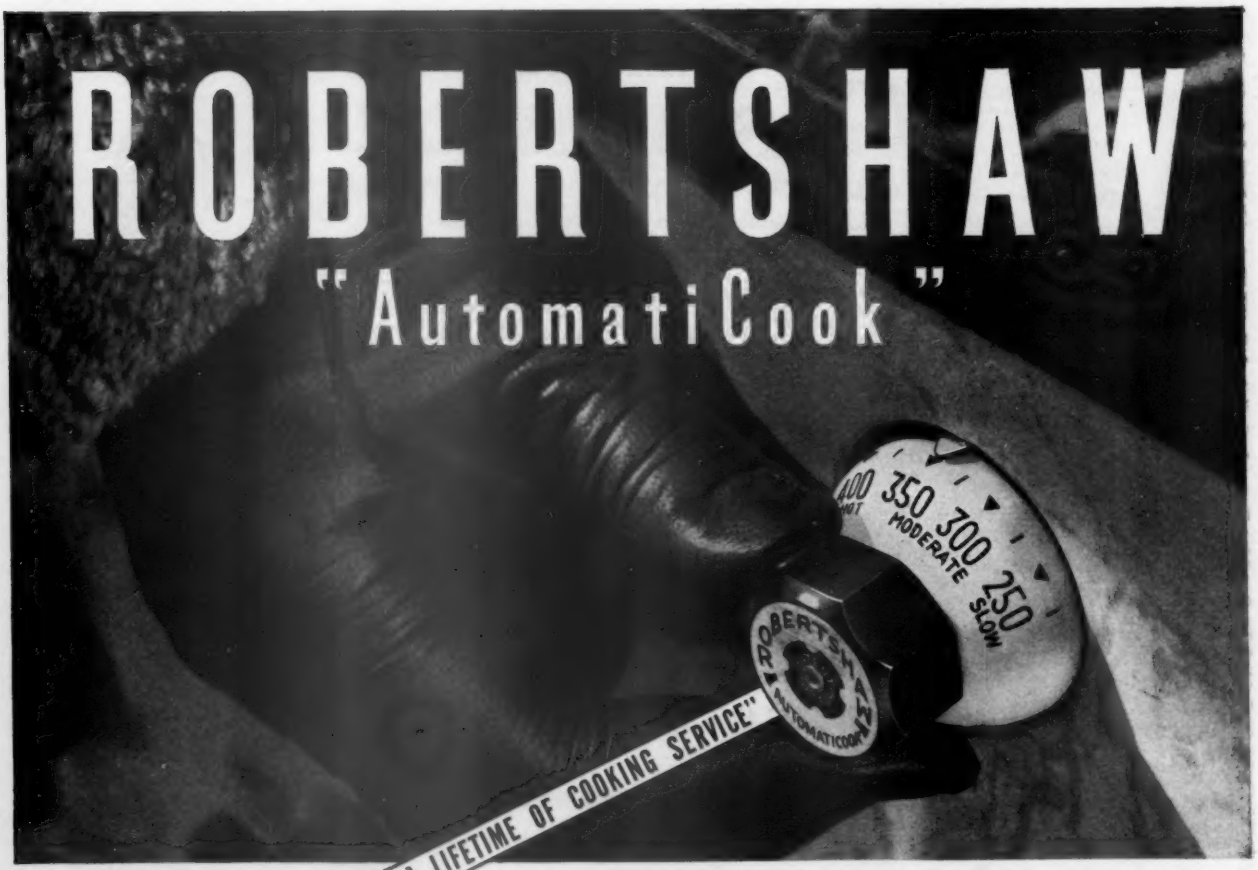

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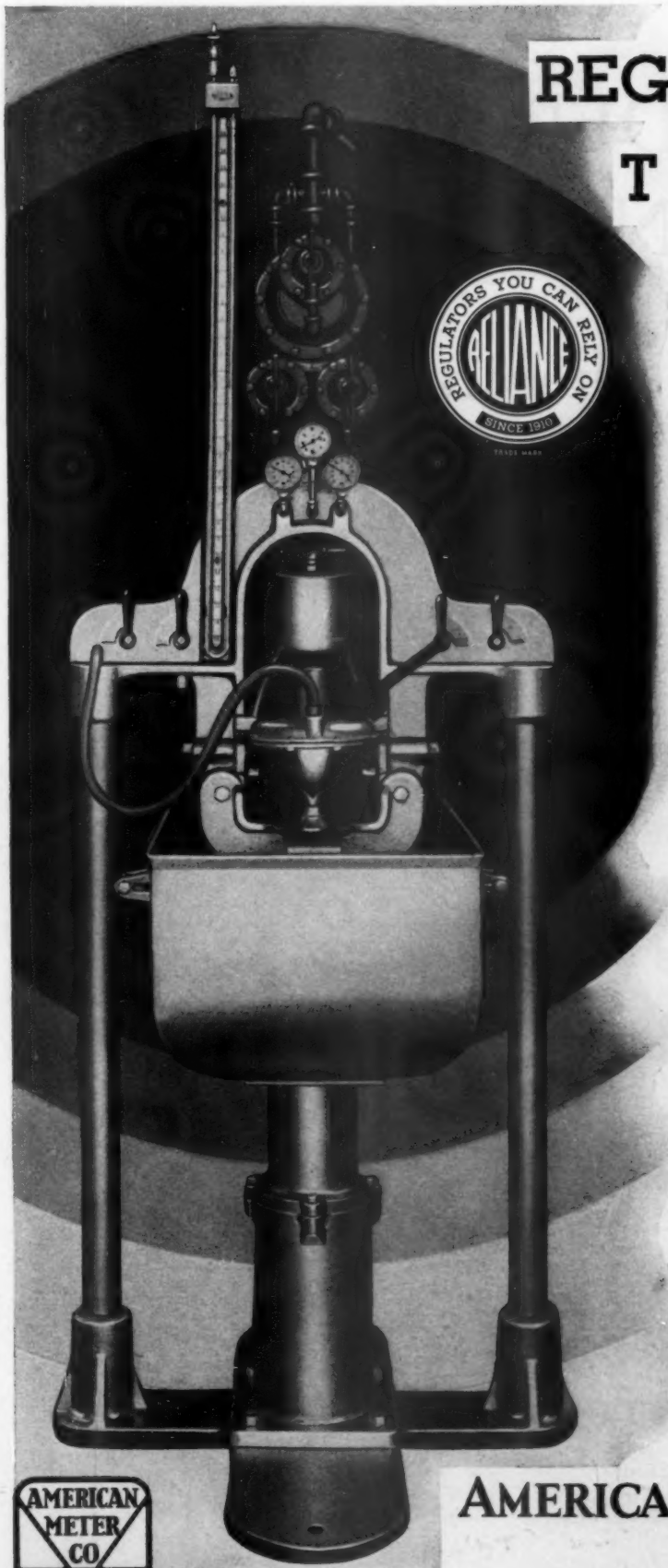

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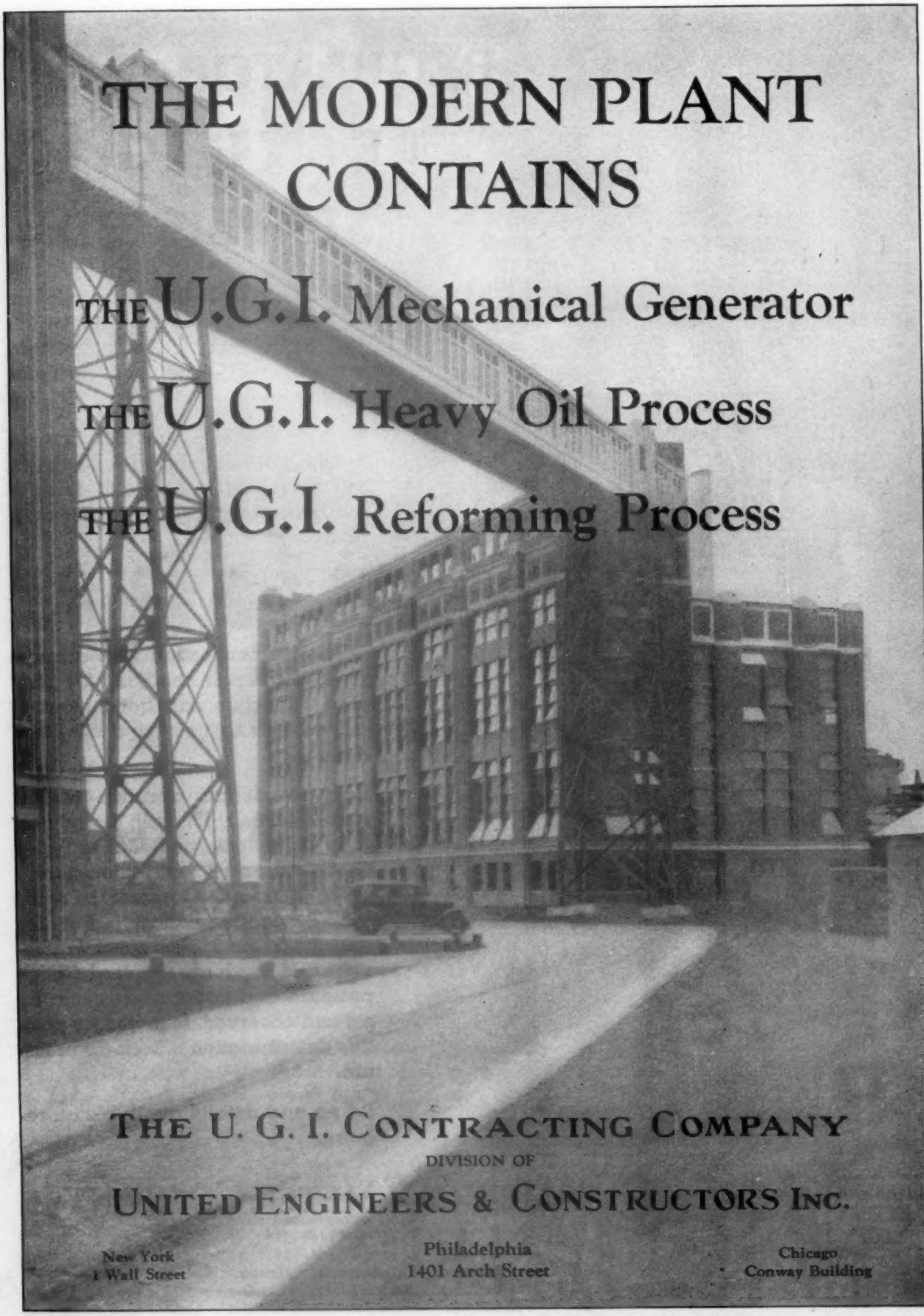
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REGARDLESS of how strongly the tides of adversity have surged against us during the year most of us possess the saving faculty of deriving strength and hope from the Christmas season and its message of good cheer. And as America gropes stumblingly, but none the less surely, toward better times this Christmas of 1932, especially, demands that confidence and the outlook be fostered until they gleam like the brightest taper atop our best remembered childhood Xmas tree.

Back of the spirit of the season is the desire to do something for someone, something out of the ordinary. This year the great mass of people are not looking for tinsel coated gauds; rather, they listen yearningly for counsel and the long expected word from great industries and experienced business leaders that the depths have been reached and that we are surely on the way out. The question arises, can the gas industry assist in spreading the gospel of confidence and thereby accomplish two aims: first, to render humanitarian service to our friends of over a hundred years' standing; second, to engender an outpouring of good will that will be of incalculable value to us in the years ahead.

During this Christmas season and in the months to come gas companies should advise their employees to exercise extra cordiality toward the gas using public. Salesmen, fitters, meter readers and all others who enter the customers' premises have a fine opportunity to spread good cheer and optimism. High bill complaints —if such exist—especially require sympathetic handling. Surely, the housewife who has entered the gas company office after a futile battle with the budget, can stand a trifle of solicitous treatment relative to adjustment or explanation of a bill that seems unduly high to her.

On the sales floor also, the salesman can show more than his usual caution in sizing up a prospective range purchaser's financial ability to buy a certain variety of appliance, to the end that the family budget will not be made additionally more difficult and precarious.

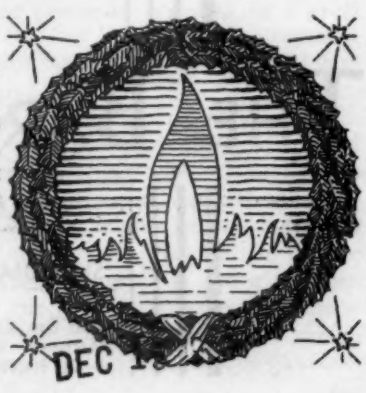
Home Service workers have a particularly fine opportunity to consult with the housewife on a personal footing. They should be able to prescribe economical but nutritious menus. Further, they are in a position to show how the meal can be cooked and any existing waste of gas saved. In this connection it was recently brought to our attention how one gas customer in the home was using her range oven to prepare the toast for a family of five—and this as against the use of the slower and more expensive electric toaster at the breakfast table.

Further, a frank and affable statement of the facts of gas fuel to the potential industrial user will make for a degree of confidence that will go far toward winning the battle against competitors.

We are not suggesting that gas men take on the attributes of shallow Pollyannas nor that they contact the public like a parcel of grinning Cheshire cats, but we believe firmly that they can well assist in holding up the morale of the public which they serve; the very nature of our business with its intimate contact with home life in many of its phases affords the opportunity. May we make the most of such opportunity.

Whether your Christmas includes the giving of a costly present or the exchange of a hearty handclasp with its cheery greeting, may you as a gas man include in your list of gifts the will to spread a message of hope and optimism this coming year.

Meanwhile, *American Gas Journal* extends to its readers and the industry as a whole the season's best wishes. May yours be a Merry Christmas.



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Vol. 137 No. 6
December, 1932

AMERICAN
GAS JOURNAL
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HENRY M. RILEY
Editor

Principles of Recuperation Applied to Industrial Gas Furnaces

E. A. LUSCOMBE
Engineer,
American Gas Association Laboratory

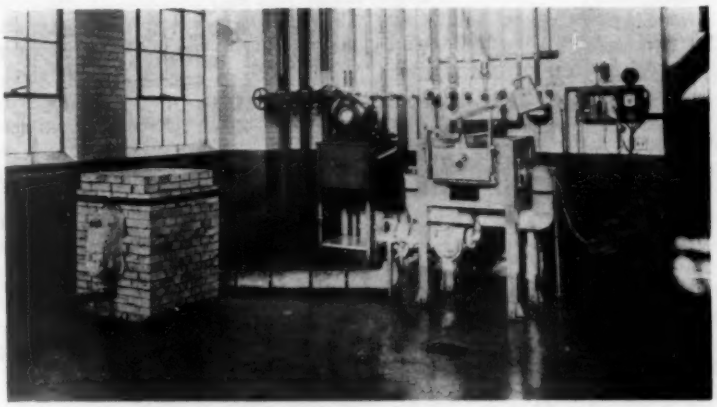

Fig. 1. View of Equipment Used in First Series of Tests. Brick-Walled Recuperator at Left, Test Furnace at Right

PERSISTENT competition in marketing manufactured products is continually prompting engineers to seek new economies in industrial procedures. Frequently these economies are effected by radical changes in production methods or by installations of new and more efficient equipment, but often, marked additional savings may be secured by the analysis of heating processes and the subsequent adoption of the proper fuel and method of its application. Gas has long been classified as an ideal industrial fuel and has been found in many plants to lead not only to higher efficiencies, but also to distinct improvements in the quality of the final product, reduced rejections due to faulty manufacture, and enhanced market value. The flexibility and facility of accurate control of gas combustion together with its adaptability to so many different types of heating processes accounts, in a great measure, for its universal acceptance as a desirable source of industrial heat energy.

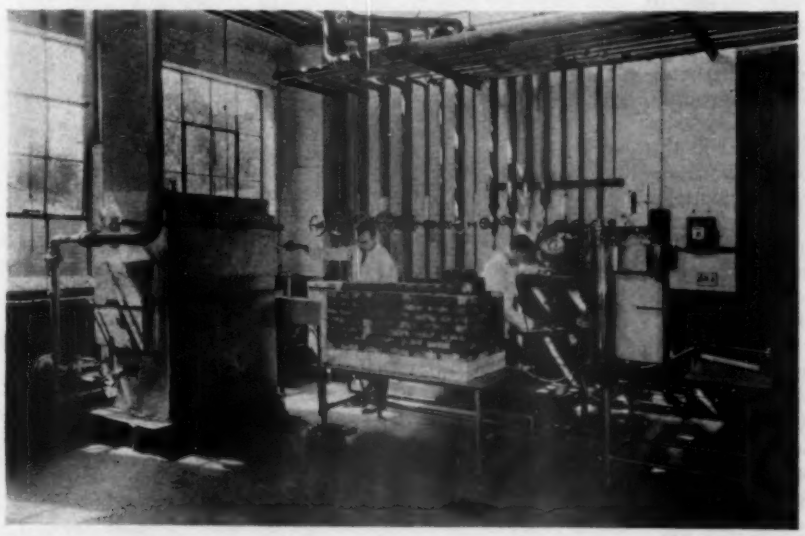

Fig. 2. General View of Recuperator and Test Furnace Used in Second Series of Tests. Recuperator at Left, Test Furnace at Right

The economies inherent in gas utilization can be extended even further if certain basic principles of application are recognized and applied. A study of the heat balance of an industrial furnace, i.e. the distribution of the equal heats supplied to and withdrawn from the given system, reveals many interesting considerations, chief among which is the fact that the flue gas leav-

ing a high temperature industrial furnace carries away a considerable portion of the total heat supplied. In fact, the higher the working temperature within the furnace, the higher the temperature of the flue gas, and, consequently, the greater the heat loss. For very high temperature operations the heat content in the flue gas may amount to as much as 80 per cent of the total heat in the fuel. Obviously, therefore, any process which will return a portion of this flue gas heat to the work in usable form is not only desirable, but usually quite profitable.

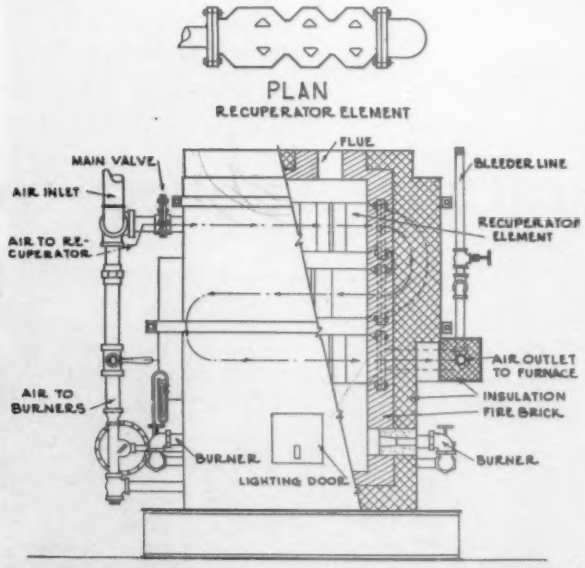

Fig. 2a. Sectional Elevation of Recuperator Used in Second and Third Series of Tests

Sizable quantities of heat may be reclaimed from the flue gas by several methods, the more common involving the employment of preheaters, waste heat boilers, economizers, regenerators, and recuperators. All of these methods have been successfully applied in various industries, but obviously all are not equally adaptable to the particular needs of each installation. Nevertheless, recuperation in particular can be employed with practically any industrial gas application, for this process not only returns the heat in a form that can be readily utilized in an industrial furnace, but also results in the maintenance of more uniform furnace conditions after equilibrium has been reached.

Realizing the need for basic and authentic information concerning the fundamental relationships surrounding recuperation, the Committee on Industrial Gas Research of the American Gas Association initiated in the fall of 1929, at the A.G.A. Testing Laboratory, a research project entitled, "A Study of the Characteristics of Burning Gas with Preheated Air." This paper presents a very brief resumé of the work conducted during this investigation and the results obtained therefrom. More detailed consideration is accorded the subject in a bulletin* recently published by the Association.

It is felt that the conclusions of this study constitute strong, indisputable arguments concerning the value of the recuperation process. Earlier analyses and comments on the subject, as revealed in literature, reflected variations in opinion, and, except in one or two instances, were not substantiated by both theory and experiment. In many cases the lack of definite information relative to the conditions of test or the basis upon which deductions were made has depreciated the value of results. Lellep[1], Hay[2], Wyer[3], Michel[4], Barr[5], and Nutting[6], have expressed opinions which do not wholly concur, although Mawhinney[7] and Trinks[8] have proposed formulae for calculating the gas savings resulting from burning gas with preheated air which are identical with one developed in connection with the present study. In this research, relationships set up as a result of careful theoretical development, have been checked by precision testing equipment, covering wide ranges of conditions, and interpreted in relation to practical application. It is hoped that the findings of this project will supply gas producing and consuming industries with fundamental information on recuperation that will assist them in increasing plant economy and ultimate service.

* *"A Study of the Characteristics of Burning Gas with Preheated Air", Industrial Gas Research, American Gas Association, Laboratory Report No. 685, 1932.*

Theoretical Considerations Relating to Recuperation

To establish theoretically the effects of burning gas with preheated air, comprehensive and fundamental calculations were made of the heat balance of industrial gas furnaces. These studies indicated that there are three principal ways in which heat introduced by preheated air may be dissipated; first, it may be used to increase the quantity of useful work done, keeping the gas rate and furnace temperature constant; second, the heat may be utilized to increase the furnace temperature, keeping the quantity of work and gas rate constant; or, third, it may be used to decrease the volume of gas burned, keeping the quantity of work and furnace temperature constant. Any one of these methods may be combined with any other to yield a more complex method for realizing on the heat supplied in preheated air. However, it is felt that the three simple means are of greatest importance.

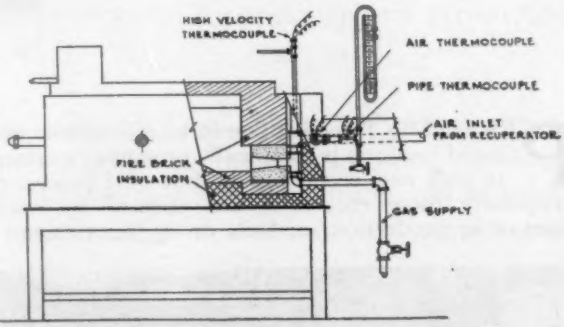

Fig. 2b. Sectional Elevation of Test Furnace Used in Second and Third Series of Tests

If all the additional heat introduced by preheated air is to be utilized to increase production of work in a given furnace, the gas rate and furnace temperature must be held constant in order that radiation, convection, and flue losses remain unchanged. Under such circumstances all heat in the air is available for heating a greater quantity of work, and it can be shown that the theoretical increase in production can be expressed mathematically in the following formula:

$$I = \frac{A}{W_e} \times 100,$$

where I = per cent increase in production,
A = heat in air supplied, Btu/cu. ft. of gas,
and W_e = heat absorbed by the work without preheated air, Btu/cu. ft. of gas

If, on the other hand, the second principal method of utilizing the heat introduced by the air is to be em-

ployed so that the sole effect is an increase in furnace temperature, the quantity of work and gas rate must be maintained constant. Because of the complex natures of the numerous variables affecting the equilibrium temperature of a furnace, it is obviously impossible to derive a simple expression applicable to all furnaces for an increase in furnace temperature brought about by preheating air.

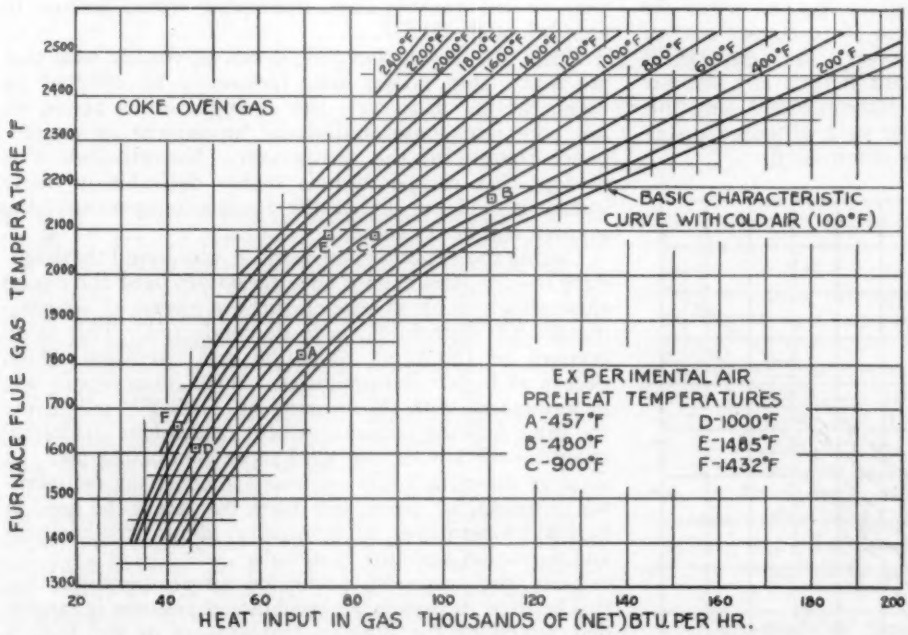

Fig. 3. Basic and Theoretical Characteristic Curves of Test Furnace Operating with a One Per Cent Oxidizing Atmosphere at Various Air Preheat Temperatures with Coke Oven Gas

Finally, if the heat introduced by preheated air is utilized to decrease the gas rate while the furnace temperature and quantity of work are maintained constant, it can be seen that the radiation and convection losses are unaltered. However, the flue loss per hour is lower, inasmuch as a smaller quantity of gas is consumed, although the flue loss per cubic foot of gas burned is unchanged. The per cent gas savings will then depend on the heat in the air supplied per cubic foot of gas, and the available heat at the given furnace temperature. This relationship may be expressed mathematically as follows:

$$S = \frac{A}{G - F_G + A} \times 100,$$

where S = per cent gas savings,
G = gross heating value of gas, Btu/cu. ft.
A = heat in air supplied, Btu/cu. ft. of gas
and F_G = sensible and latent heat in flue gas, Btu./cu. ft. of gas (together with any loss due to incomplete combustion and dissociation).

It is of interest to note that the first method of utilizing heat introduced in preheated air is, in reality, a special form of the third method as can be mathematically illustrated. Therefore, the results secured in these two cases should always be comparable.

Experimental Verification of Recuperation Theory

To verify the theoretical formulae developed and to procure other information usable in making practical applications of recuperation, an extensive series of tests, involving over 12,000 separate observations, were conducted with both natural and coke oven gases on two different types of furnaces, each in conjunction with a suitable recuperator (separately fired by gas for more accurate and flexible control). These tests covered a range of furnace temperatures from approximately 1400 to 2500 degrees Fahrenheit with neutral, reducing, and oxidizing furnace atmospheres, and with air for combustion preheated as high as approximately 1625 degrees Fahrenheit.

The first series of tests were conducted on a small, standard (high temperature) oven furnace, the air for which was preheated in a specially designed, separately fired, two-pass metallic recuperator. This complete installation is shown in Figure 1. These tests substantiated the correctness of the theoretical formulae over certain ranges of furnace temperature, furnace atmospheres, and air preheats. However, the range of both furnace and air preheat temperatures was relatively small, and the equipment and conditions of test were so limited that no generalization of the results was possible. Such objections were overcome by constructing, as shown in Figure 2, a new furnace and three-pass metallic recuperator capable of operating over a greater range of temperatures and higher air preheats.

As a foundation for the second series of tests, the basic characteristic temperature-input curve of the test furnace, operating with air at room temperature, was first established. During this work the furnace atmosphere was maintained at the desired point and checked frequently by careful flue gas analyses. Flue gas and air temperatures were measured by means of specially designed high velocity chromel-alumel thermocouples. Particular attention was paid to the thermal equilibrium of the furnace. All openings in the furnace, other than the flue, were cemented tight to eliminate any infiltration of cold air.

After establishing the basic characteristic curve, the various preheat curves were calculated by means of a mathematical procedure developed for this purpose. These preheat curves were then checked at various points by values secured experimentally, using the test apparatus. A representative series of curves illustrating the basic and preheat temperature-input relationships together with the experimental check points secured by operating the newer test furnace with coke oven gas is shown in Figure 3. The corresponding theoretical and experimental gas savings obtained with coke oven gas under varying conditions of air preheat and furnace temperature are shown in Figure 4. From these curves it can be seen that the experimental and theoretical values are in very close agreement. Similar tests were conducted with various furnace atmospheres while burning natural gas. All of the results secured in this investigation seem to indicate that the formulae developed are correct over the entire range of industrial furnace operation and are applicable to any kind of city gas.

Although it is possible, by means of recuperation, to

recover considerable portions of the heat lost through the flue of high temperature furnaces, the cost of the heat salvaging equipment and its maintenance greatly affects the permissible economies of the process. Obviously, there is a certain point at which the maximum heat recovery per unit of investment is reached. This point depends so much upon individual conditions that it is impossible to establish any one figure or relationship applicable to all cases. It has been stated[9, 10, and 11], however, that the economic limit is reached when the preheated air temperature is from 50 to 60 per cent of the flue gas temperature. However, this figure is, at best, only an approximation, and before any definite conclusions are drawn, it is recommended that the economic limit of air preheat for each proposed installation and set of conditions be determined.

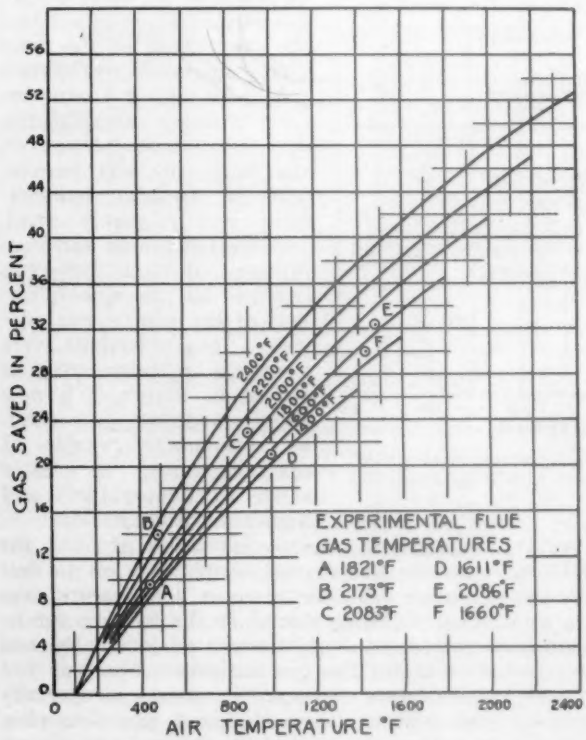

Fig. 4. Theoretical and Experimental Savings Effected by Burning Coke Oven Gas with Preheated Air at Various Furnace Temperatures and with a One Per Cent Oxidizing Atmosphere

To obtain a more definite idea of the practical value of recuperation, the following examples are presented: Assume that a continuous annealing furnace is operating with a flue gas temperature of 1400 degrees F., and burning 2500 cubic feet of coke oven gas per hour (550 Btu/cu. ft.) with the air required for combustion at room temperature. A recuperator is then placed on the furnace and the air for combustion preheated to 700 degrees F., (and for the purpose of illustration, assuming a one per cent oxidizing furnace atmosphere) it can be seen from Figure 4 that a gas saving of approximately 14.2 per cent should result. This would mean a saving of about 355 cubic feet of gas per hour or 8,530 cubic feet per day. If we assume a gas rate of $0.65 per thousand cubic feet, the savings would then amount to about $5.54 per day. In a working year of 250 days, this would represent a total saving of, roughly $1,386. As a second example, assume that a forging furnace operates with a flue gas temperature of 2,200 degrees F., and consumes 2500 cubic feet of coke oven gas per hour (550 Btu./cu. ft.) with room temperature air. A recuperator is placed in operation, which will raise the temperature of the air for combustion to 1100 degrees F., (with a one per cent oxidizing furnace atmosphere) it can be seen that a gas saving of approximately 29.1 per cent should result. This means a saving of approximately 17,450 cubic feet of gas in twenty-four hours. On the basis of the gas rate given above, this represents a saving of $11.35 per day. Computed on the basis of a year of 250 working days, the saving would amount to approximately $2,837.

From the above examples, it can be readily seen that an appreciable saving may frequently be effected by recuperation. However, the savings shown above do not take into consideration the investment or maintenance charges of the recuperator. Nevertheless, it is evident that recuperation is highly desirable in many instances, and the higher the furnace temperature, the greater will be its value.

During the experimental work, it was found that ordinary iron or steel cannot be successfully used for piping through which air at temperatures in excess of approximately 800 degrees F., is to be conducted. This is on account of the rapid oxidation and corrosion which occurs at higher temperatures. Such observations are in agreement with those made by Speller[12], who gives the same limiting temperature for continuous successful operation of low carbon steel pipes conducting air. In view of these facts it is necessary to construct recuperator elements, air pipes, and ducts that are to be used at higher temperatures, of refractory, alloys or other heat and corrosion resisting materials.

Since the maximum preheated air temperature that can be used in premixing combustion systems is largely determined by the ignition temperature of the fuel, a study was made of ignition temperatures of gases. Numerous tests were conducted and in view of the resultant data and other information secured from various sources, it seems advisable to recommend that the temperature of the air used in premixing systems be limited to not more than 1,000 degrees F., in order to avoid the hazards of preignition of air-gas mixtures. However, nozzle or port-mixing burners can be successfully employed with practically any obtainable air temperature.

According to W. C. Buell, Jr.[13], operation with preheated air results in sizable decreases in the combustion space required. He states that with air preheated to 2,000 degrees F., the heat liberated per cubic foot of combustion space can be increased approximately 500 per cent when natural gas is being burned and 334 per cent when coke oven gas is the fuel. Although no experimental work has been conducted on this phase of the problem, the Committee on Industrial Gas Research of the American Gas Association is sponsoring an allied research problem entitled, "Research in the Fundamentals of Combustion Space Requirements in High Temperature Furnaces," and it is expected that, upon the completion of this problem, considerable valuable information concerning combustion space requirements will be available, which may be applied to the conditions encountered in burning gas with preheated air.

Dr. Passauer[14] points out that preheating increases the ignition velocity of city gas-air mixtures almost directly as the square of the absolute temperature. Thus, flames consuming preheated gas or air are short and, therefore, they are confined more closely to the burner port than flames burning with room temperature air. Because of this resultant greater heating action combined with the heating effect of the mere passage of hot air through the burner prior to combustion, heat and

(*Continued on page 29*)

Retailers' Viewpoint of Public Utility Appliance Competition

RIVERS PETERSON
Editor, Hardware Retailer

WE have, I believe, about three classes of dealers, or perhaps I should say, three general points of view. One such is that the public utility has no place in appliance merchandising. The dealer does not want to meet its competition on either an equal, non-cooperative basis, nor does he want such competition even on the cooperative basis that has been well developed in certain sections.

To all overtures, to all appeals, made to such a dealer he has but one answer—"Legislate them out of business, they have no right to be in it."

The second class hasn't much interest in the matter one way or another. That dealer handles appliances more as a convenience than anything else. He knows that regardless of the kind of competition the utilities may offer, he will sell a few appliances anyway, and his ambitions in this direction are not great, nor his energies of much force.

Between these two extremes is a middle ground where we find the dealer who is reasonably tolerant, and unusually confident of his own ability. He reasons along the broad lines that anybody has a right to be in business and that so long as they play the game fair he is willing to take the business he can earn and let the fellow who is capable of beating him out have the share he can get.

It may be of interest to you to know that, so far as I can observe, this class is decreasing. Those who have held such a viewpoint are gradually joining the more radical who want utilities legislated out of business.

Reason for Change

The change, I think, is brought about by a growing conviction that no matter how earnestly the heads of merchandising departments may desire to keep competition on a fair basis it is impossible to avoid breakovers by employees.

The feeling is intensified among dealers where the merchandising situation is satisfactory by reports of conditions where the utility does not cooperate and uses the advantages it possesses as fully as possible in selling merchandise.

As an illustration a complaint was published this year of a utility which offered customers their choice of five different makes of refrigerators. On boxes selling up to $100 there was no installation charge, no down payment required, free service given, no carrying charge made, and the payments were $2.00 a month.

On boxes selling up to $200 the same terms were offered with the exception that the monthly payments were $3.00.

On larger sales the monthly payments were $5.00 and the other terms the same.

No dealer who expected to make anything from refrigerator selling could meet those terms. They were unfair as well as uneconomic. Naturally, the dealers directly affected were indignant. Dealers in other localities who heard of it could not help feeling that so long as the utilities in their towns were engaged in selling merchandise a similar threat hung over them. Under such circumstances it is not surprising to see the conservative swing over to the more radical viewpoint and join efforts with those dealers who insist that merchandising has no place in utility activities.

Example of Good Selling by Dealers

Utility competition is not a new situation as far as my personal experience goes. More than twenty years ago I sold gas ranges in Dallas, Texas. The gas company in that city was engaged in the sale of such appliances also. But they were not particularly energetic, nor especially good merchandisers. We had occasional complaint where some of their employees made unwarranted and foolish statements about our merchandise, but that was about the worst condition we had to face.

As a matter of fact it seems to me that the retailers in Dallas did such a good job with gas appliances that the utility finally closed its merchandising department.

Some years later, about 1915, I believe, I became interested in a hardware business in Muncie, Indiana. This store had never done much with the gas appliance line. The gas company there was not very active. I am not sure whether they sold appliances directly, or whether that part of the business was handled by a kind of subsidiary.

At any rate we had no trouble in that town in building up a very satisfactory volume in gas ranges.

It seems to me that up until about ten years ago this situation was typical. The utilities might be engaged in the sale of merchandise but active dealers had no serious trouble with their competition.

Then conditions began to change. What caused it I am not sure. It may be that the linking of various companies together brought about a possibility of large individual orders for manufacturers and caused them to put greater efforts behind getting the utilities to push their lines more aggressively.

In any event the utilities began using their position to sell merchandise and when they choose to use such advantages fully no dealer can successfully compete

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Presented before Indiana Gas Ass'n. Convention, French Lick, Ind., Oct. 4-5, 1932.

with them. Many of them, despite the just complaints of dealers, are still making it impossible for the retailer to cope with them.

A Glaring Illustration

A dealer recently told me this experience. He had sold a customer who was moving into a new home a gas range. Application was made for service. The gas company notified him that fifty feet of service pipe would have to be run, for which there would be a charge of $50. But, he was told, if he would purchase his range from the gas company this service would be run free.

Obviously, the customer cancelled his order with the hardware man and bought the gas company range.

I can't see how any one could offer a sound defense for such a policy. Presumably the prime interest of the utility lay in getting the home owner to use gas. I judge he would have used just as much gas with the appliance he had purchased from the hardware store as the one he finally secured from the gas company.

And I doubt whether there could have been sufficient margin in the transaction to permit the utility to absorb a charge of $50 for service work and make any money on the sale of the range. That, to me, is one of the mysteries of utility merchandising. You men who are engaged in it, who know the inside, may understand why such things are done. But no one has ever been able to explain it to me, or rather, has done so.

The incident I have just related occurred in New York state. Perhaps such things are not done in Indiana. But they have been. A few years ago it was necessary for me to complain to the Utilities Commission in this state that the gas company in Muncie was making the identical offer. They may be doing so yet for all I know.

What the Dealer Does Not Understand

There are a number of things about utility merchandising that the average dealer cannot understand. He appreciates the fact that your companies wish to sell as much gas, or electricity as you can. But he can't understand why, when the dealers in a town are doing a good job of merchandising, the utility should adopt merchandising methods and practices that drive the other sellers out of business.

I have mentioned the Muncie case because I was familiar with it. I know the company in which I was interested there did do a good job of range selling and built a nice volume. And I know that when the gas company there turned loose all its merchandising guns it wiped that business out of existence.

Were consumers any better served? I doubt it. Did they get better appliances? I don't believe it.

Conceding that the utility merely wants to sell its product the dealers do not understand why extensions of mains should be a carefully guarded secret until the gas company salesmen have canvassed every prospect the extension will create. Or why these salesmen should constantly inform such prospects that the only sure way to get gas service is for them to place orders with the utility for ranges and other appliances, and that when sufficient orders have been placed the extension will be made.

The retailer does understand that the utility wants to be assured of a certain amount of business before it undertakes the extension. But he thinks that amount might be even more easily obtained if the live dealers in the community are told what the utility has in mind and are given a chance to do some soliciting themselves.

The conclusion he is most likely to reach is that the gas company wants to hog everything.

Nor does the dealer understand the trade-in practices of many utilities. He appreciates the fact that trade-ins will induce customers to buy appliances. But if the gas company is just interested in selling gas, how has it increased consumption by getting a gas customer to replace the range she is using with another gas range?

There is a record of one drive made in Iowa where very attractive trade-ins were offered resulting in the sale of a considerable number of ranges. And in every case the consumers' bills were lower after the new ranges had been installed than they were before.

That, we admit, was a good thing for those consumers but I can't see where it was profitable to the utility, and certainly it made it impossible for dealers in that town to sell ranges, since they were unable to meet the trade-in terms offered.

Matter of Instalment Selling

But more destructive of dealer business than excessive trade-ins is the manner in which the instalment plan has been used by utilities in promoting the sale of merchandise. The utility has reasonable assurance of profits in the rates that are fixed for its products. It can conduct its appliance business at a loss without being seriously affected. And, therefore, it can, and sometimes does, sell merchandise on terms that no merchant can match and make money.

His financial resources are more limited. He cannot afford to tie up a large amount of capital in instalment credits. He must get a reasonable capital turn-over. And when he faces the utility competition of terms he is forced to throw up his hands and see the volume necessary to his profit diverted from his store.

Nor is the dealer willing to concede that the gas company in his town is the only reliable source of knowledge in the use of gas appliances. He knows there isn't any great mystery connected with the adjustment of a gas range. His employee who helps install the range and who adjusts the burners for a clean, hot flame has just as high an I. Q. as the utility employee who does the same thing.

As a matter of fact it has been my personal experience in some places that it was necessary for us to send a man back to the customer's home after the gas company had turned on service and readjust the range the utility employee had adjusted. We found if we did not that the customer did not get the service the appliance should provide.

But, in many localities there seems to be a definite effort on the part of gas utilities to make customers believe that the gas company is the only dependable authority on appliances and, therefore, should be consulted in preference to all other dealers.

Control of employees is a factor of no small importance in the competitive situation. Admittedly it is difficult to handle. Your employee is naturally loyal to your company. He may feel that he has merely done what he has been paid for when he visits a home where an appliance bought from a dealer has been installed, looks it over, shakes his head dubiously and tells the customer that it is too bad she didn't buy an improved appliance from the gas company.

And the salesman with a commission in sight may not feel that he has overstepped the bounds of business ethics if he leads the customer to believe that unless

she buys the appliance which he has to offer the company will not make connections, or will not guarantee satisfactory service.

Of course, infractions of this nature are not confined to utility salesmen. For many years, it was a very effective argument to tell the prospect that the gas company was merely interested in selling gas, and the appliances they had to offer would use more gas than the line the dealer carried. Perhaps that argument is still used, though I doubt its effectiveness with the customer today.

Dealer Thoughts on Handicaps

In two respects the dealer feels that the merchandising utility has an advantage over him which constitutes a handicap and which even the fairest of merchandising policies cannot eliminate.

One is the common belief of consumers that unless they meet instalment payments to the utility, service will be discontinued. This, coupled with the fact that a bill must be mailed each month anyway, makes it possible, the dealer feels, for the utility to sell on smaller down and smaller monthly payments than the dealer can afford.

And he also feels that he is placed under a handicap by reason of the fact that the utility gets the first chance at most new business. The consumer must go to the utility office to apply for service. And perhaps it is no more than good business that information regarding such a prospect is immediately given a utility salesman and he is right on the job.

I say that is no more than good business, but from the dealer's standpoint it is an advantage the utility should not enjoy. If the utility were not engaged in the sale of appliances such a customer would have to look around.

The common justification by utilities for engaging in merchandising is that they must do everything possible to increase consumption of their prime product. That argument has been used so often that dealers are now beginning to hand it back to the utilities.

Why, they ask, if that is the sole object of the utilities is their competition frequently more aggressive where dealers themselves are aggressive? Why, when they know a consumer is going to buy an appliance somewhere, will they use almost any kind of persuasion to get the order themselves, sometimes sending two salesmen to the home after the customer has purchased elsewhere, in the effort to unsell the customer on the appliance she has decided upon and persuade her to take the one the utility has to offer?

The case which comes to mind just now concerns an electric range. I cite it because it is typical of what has happened with gas in other instances. The purchaser was the regular customer of a hardware dealer. She selected a range there and so notified the power company. The utility salesman made a very favorable trade-in offer for an oil stove that was to be replaced. He learned the couple intended giving this oil stove to their parents whose oil stove was wholly worthless. It looked as if the sale must surely go to the hardware dealer until the salesman conceived a bright idea. He would make the allowance for the oil stove, but instead of taking the one this couple owned they could give that to their parents and he would accept the one which the parents were going to discard.

He got the business.

But, as the dealer asked me, "Did the utility sell any more current by reason of this? And don't they say that is the only thing they are interested in?"

These are a few of the things the dealer faces in utility competition, and the way he looks at them. What the eventual answer will be perhaps no one can forecast.

Certainly there has been material improvement in the situation during the past few years—a great deal more, I believe, in the electric field than in gas.

But in spite of the sincere efforts many utility men have made, there is a constant cropping out of complaints that keep dealers stirred and keep up agitation for elimination of the utilities from the merchandising field.

A Suggested Solution

One solution, which does not go so far as legislation has been proposed. It calls for complete segregation of the merchandising department from the utility proper. It would provide for a separate corporation to engage in the sale of appliances, to be housed in a wholly different location, and to be operated on a profitable basis wholly independent of the utility.

No utility employee should favor this concern more than any other in the town engaged in the sale of appliances. No utility employee should receive any commission for the sale of any appliance. Meter readers, office and other employees, should do the work for which they are engaged instead of acting as salespeople on the side.

Let such a separate organization merchandise just as aggressively as it will, so long as it follows sound methods that will yield a profit.

Certainly under such circumstances there can be no complaint on the part of the utility that every consumer possible is not being persuaded to buy and use appliances, and on the other hand there can be no dealer complaint that this competitor possesses the advantage inherent in the present utility set-up.

I do not profess to prophesy that this will ever come about. So far the gas interests have turned deaf ears to any form of segregation.

Yet I am convinced that until some such situation is brought about the utilities may prepare to fight continual efforts to legislate them out of the merchandising business.

Effective Window Display

Here is a splendid example of window trim which embodies considerable human interest. It is by Consolidated Gas Co. of New York.

Introducing New Appliances via Window Displays

STUART BRATESMAN,

Manager, Display Department, Boston Consolidated Gas Co.

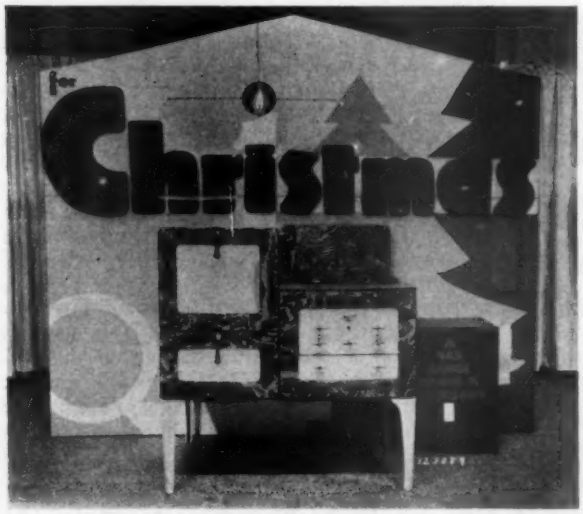
A CERTAIN eastern gas company recently took on a new line of automatic storage water heaters. Part of the merchandising program covering the sale of these appliances was devoted to a series of window displays. These advertisements played a big part in unloading the various water heater models.

Two of this series appears on this page with these lines. The display with the thermos bottle theme was the key set of the series. Notice that it merely states the simple fact of construction and adds the inducement to come into the office and inspect the model closer; that's all.

An attempt was made to introduce a new note in the other display. No rectangle background appears in this design. The giant figure of the woman and the water heater forming the extremities. Six inch deep cut-out wooden letters form the caption. First person copy was interestingly used here to make the reader at ease. You'll find that the average person doesn't like to be shouted at in copy. Make them at ease and your story is half told.

Designers of advertising are constantly striving to break away from the commonplace. This series could

have been easily handled in the old-fashioned trumpet-page boy treatment, but a sincere attempt was made to introduce a fresh style. That the series proved of decided interest showed that the attempt was worthwhile.



Christmas Display Suggestions

HERE are two Christmas display suggestions; use them in your windows this Christmas. They are not complicated designs; any sign painter can easily reproduce them for you. Don't neglect your windows this Christmas. People are "on the buy" more than ever before.

Fuel Markets for Bottled Gas

THE liquefied petroleum gas industry, of which bottled gas is a major part, has experienced a remarkable growth as is shown below:

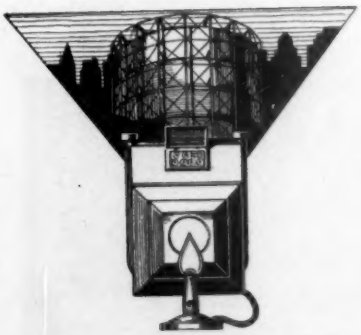
Year	Total Marketed Gallons	% Increase from Preceding Year	% Marketed as Bottled Gas	Lbs. Marketed as Bottled Gas	Number Bottled Gas Customers	Average Lbs. Per Customer Per Year
1922	222,641*					
1923	276,863*	24.0				
1924	376,488*	36.0				
1925	403,674*	15.0				
1926	465,085*	23.0				
1927	1,091,005*	134.0				
1928	4,522,899*	315.0			20,000*	
1929	9,930,964*	120.00			55,000*	
1930	18,017,347*	82.0			117,000*	
1931	28,502,819*	58.0	54.0*	64,500,000	150,000*	430
1932	32,500,000	11.4	53.3	73,100,000	170,000	430

* U. S. Department of Commerce data published Feb. 11, 1932 (1932 figures estimated by writer)

Assuming that the *average* bottled gas customer pays a net of 11¼ cents per pound for fuel, the gross revenue from gas sales would have been seven and one-quarter millions of dollars in 1931 and should amount to eight and one-quarter millions of dollars in 1932. If the industry reaches the total of one million customers, the gross annual gas revenue will total $45,000,000, based on the then probable average of $45.00 gross revenue per customer per year, or an average net gas bill of $3.75 per customer per month. Only a small part of this income will go to the fuel producers, by far the greater portion being accounted for by transportation, distribution, and customer servicing costs, by fixed charges, and by the possible return on the huge investment.

Intelligent load building through promotional work with customers already under contract, is one of the most vital future activities of the industry. Only by volume of fuel sales, by high customer saturation in a given territory, and by the consequent increasing of gross income as compared with operating expenses and fixed charges, can our industry make a fair return on its investment and justify its existence, its perpetuation and its future growth.

This discussion of fuel markets would not be complete without considering the available supply of raw material from which bottled gas (largely propane) can be produced. At the high level of 40 pounds average per customer per month, one, 40,000 pound tank car of propane per day will supply 30,000 customers. One million customers would consume, at this rate, thirty-three cars per day. Over seven hundred cars of propane per day are available in the United States from natural gasoline sources alone, and perhaps an even greater amount can be supplied by petroleum refiners. We need not concern ourselves about overselling the potentially available bottled gas supply.—*R. W. Thomas, before National Bottled Gas Assn. Convention, Oct. 13, 1932.*



Centralization of Gas Meter Repairs

G. M. JOHNSON

Manager Northern Indiana Public Service Company, South Bend, Ind.

THE purpose of this paper is to briefly illustrate the present system of repairing meters in this company, and to describe some of the advantages of this system over some of the previous systems.

From a public relation, state commission, and a "lost gas" standpoint, the company strives to repair meters economically and accurately, so as to have the repaired meters the equal of new meters for at least a period of years called the change period. In order to assist in the obtaining of this standard, the company has set up rigid rules as to locations for meter sets, gas conditioning, etc. Also, a thorough analysis is periodically made of each situation in order to gather facts as to what should constitute the economical change period, the diaphragm life and the meter life. These, however, are outside the limits of this paper.

The scope of this report is to primarily discuss the functions of the central shop and local shops in the handling, routing, transporting, and determination of the kind of repairs and where they are to be made. No attempt will be made to analyze and explain actual shop repair methods as to soldering, tinning, removing backplates, etc.

The paper will, therefore, involve a description of:

- The history and evolution of the systems used by this company.
- The territory, number of towns, sizes, etc., at present served.
- The routing and transporting of the meters.
- A description of one of the shops.
- A resume and analysis of how the system is working out.
- A summation of advantages and disadvantages noted to date.

Before explaining the system in use in this company, the following pertinent fact should be recognized, which is that no one system is ideal for all situations. Such factors, as size of towns, distance to central shops, distance between towns, transportation facilities, labor as to cost and calibre, must be taken into account.

Previous Practice

The local towns previous to 1924 did most of their own major repairing. Of 105,415 meters in service January 1, 1924, 63,755 or over 60% were located in Hammond, Fort Wayne and South Bend. A committee appointed at that time made a careful study of the metering situation and recommended the following: "After an investigation of the meter repair costs based on 1923 figures, we feel that a central meter repair shop should be maintained for the handling of all major repairs which will effect an annual saving to the entire company of approximately $15,000.00 per year." These figures were estimated from some of the following data. That one-fifth of the meters were changed each year, that 50% required major repairs, that freight rates averaged 34c per meter and that savings of approximately $1.50 per meter for major repairs would be made. This plan was put into effect, and needless to say considerable savings were effected to the company.

In January, 1932, the system was modified to have a common badge for all affiliated company meters, and to not necessarily send the same meters back to any town sending them in for repairs. This system will be described in detail. The company had expanded (in the state of Indiana) to include some ninety gas towns, ranging in size from 500 meters to 32,000 meters, having some four towns of approximately 30,000 meters each: Or in the company some 213,128 meters. The towns are fairly well distributed along excellent highways and railways.

Small Company's Handicap

The gas help in the smaller towns often consists of one or two men who handle complaints, read meters, run service main extensions, etc. As a result this man cannot possibly be as efficient for meter repair work as if he did nothing but repair meters. Further the company cannot afford to have and maintain as good equipment in the smaller towns, where only a few meters are changed each month, as they can in the larger towns.

With the above as a background this company has adopted what is called the "Central Repair Shop and Common Badge Method" for meter repairs. Two central repair shops are maintained, one in the northern part and the other in the south central part of the state. All major repairs, consisting of general or diaphragm repairs, are done at these two shops. Minor repairs such as OK, Adj., and Partial, are done by the local shops. All special repairs are done by the central shops.

The following is a detailed description of the mechanics of the system and some of our rules in the handling of the meters. Meters when removed from the customer's premises are immediately capped so as to insure their being in the same condition as when registering gas. The fitter must fill out his portion of the "Gas Meter Test Record" tag. The meter must then be carried in an upright position, and securely fastened in a stall in the truck where it cannot be damaged by jarring, shifting or falling, and where no tools will come in contact with it.

The meters are carefully removed in the local shops

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and allowed to set for 12 hours in the prover room, so as to assume the temperature conditions of the proving room. They are then run on the prover, and from the results of the prover test, the years in service, the life of diaphragms, the life of the meter, the kind and type of meter, etc., the local shop determines whether or not the meter should be given local repairs, sent to the central shop, or condemned. Any meter necessitating general or diaphragm (major repairs) must be sent to the central shop. The local shop man fills in his portion of the standard "Gas Meter Test Record" tag which was attached to the meter by the fitter. If the meter is repaired locally, the repairman writes in the class of repairs, result of the immersion or leak test and of the slow light or four point test, the test of the meter as repaired, temperature of the water and air, prover pressure, index, date and signs his name. In this case, the tag is to remain on file in the local shop or office.

Record of Meter's Progress

If the meter is to be repaired in one of the central shops, the particular shop to which the meter is to be sent is marked down under "Disposition of Meter" on the front of the tag and the tag is sent to the central shop, where upon completion of the repairs it is properly filled out and immediately returned to the town from which it came. Gas meter test record tags are kept on file for a minimum period of three years. When meters are sent to the central shop, the meter tags and life record cards are sent at the same time.

Each day the local shop man enters the results of the meters tested on a standard form "Report of Gas Meters Tested." This report aids in making an analysis of local meter conditions such as the proof, the meter and diaphragm life, etc., for the various sizes and makes of meters in service.

At the end of each month the local shop shall make out the standard monthly "Summary Report of Gas Meters Tested," from the sheets "Reports of Gas Meters Tested" for the month. This form is filled out in triplicate and copies are sent to the local manager, staff engineer, and the General office. The purpose of this report is to give a summary of the proof of the incoming meters by years in service.

The "Gas Meter Life Record Card," gives a complete history of the meter and is kept on file in the location where the meter is in service or in stock. This card is kept up from information supplied by the "Meter Test Record" tag. When a meter is repaired locally the information is transferred from the tag to the life record card by the local organization and the card is kept on file in the local office or shop. Should the meter require extensive repairs, necessitating it being sent to a central shop, the life record card, together with the meter test record tag is sent to the central meter repair shop. After completion of the necessary major repairs the life record card is properly filled out and held together with the meter, pending disposal. When the repaired meter is sent to another town the history card is forwarded to that town where it is kept on file. But the "Meter Tag" is sent back to the town that originally sent the meter in for repairs.

The "Life Record Cards" are filed according to number, separated by a spacer or guide for every 100 meter numbers, and a color tab is placed on the cards corresponding to the year the meter was installed.

All repaired meters have soldered on them a metal strip, which bears the code symbol for the class and date of repairs.

A meal meter badge with a common company number is placed on all meters sent to the central shop for repairs. This means that all old company numbers have to be removed. By having a common badge, two very important factors have been accomplished. First, speed in sending meters back to a town, and second, reduction in stock carried. Formerly a town had to wait on an average of five weeks to obtain the meters back that they sent to the central shop. This was the result of other meters being in the central shop, and the lot first received had priority. This meant that a town would have to keep a large supply of meters in stock. Now, a town can receive meters within twenty-four hours.

So far, we have elaborated considerably on the system of meter records which we feel is highly important for accounting purposes, as well as for analyzing the true meter performance for particular towns, gases and meters. Since inaccurate and improper metering has a direct bearing on the volume of unaccounted for gas, rigid rules must be made and adhered to and tabulated records must be kept in order to have definite knowledge as to the amount of lost gas due to metering. The keeping of good records will aid in the maintaining of good relations both with the public and the regulatory bodies.

For handling the meters sent from the local towns to the central repair shops, two systems are being used, depending upon the location of the town with respect to the railways. In one a specially equipped truck is used to transport the meters to the central shop and from the central shop to the towns. The truck has a regular schedule for picking up meters and dopping off repaired meters. The other system is to merely crate and send meters to the central shop by means of the electric railways.

The central shop acts as a warehouse for the company. They receive the meters either crated or from the trucks. They are uncrated and stacked by towns until the shop is in need of meters. The central shop works on a schedule of having a minimum number of meters completed (in stock) for sending out to any town needing meters. From the number of meters received, condemned and sent out they can efficiently operate as to keeping a minimum number of meters in stock, purchasing a minimum number of new meters, and speeding up or slowing up the shop.

EXAMPLE:

A town has twenty meters ready for major repairs, and they need ten meters for setting. The truck on its next regular trip drops off ten repaired or new meters, and picks up the twenty in need of repairs. The twenty are removed to the central shop and in time are thoroughly examined, and if any should be condemned, they are set aside. Assume five are condemned. The remaining fifteen are repaired and placed in stock, and exentually sent to whichever town requires meters. The same meters do not necessarily go back to the same town that sent them in. But discretion is exercised, and if practical some of them may be sent back to the same town. This is to balance, as best as possible, such conditions as old style meters, etc. At present, the central shop superintendent states that no town has received a poorer type of meter than they sent in.

The central shop crates the meters where necessary and lately have designed an ingenious type of box that will effect a saving to the company.

How The System Is Working Out

The following are some figures and data on how the system is working out. At the end of July 31, 1932, the stock of meters for all the towns was 2277 as compared with July 31, 1931, 3377 and July 31, 1929, 4428.

Meter repair costs at South Bend, January 1, 1932 were $4.33 for 5 Lt. tin meters for complete diaphragm

repairs (includes two new diaphragms, cleaning and grinding valves, repacking stuffing boxes, proving and painting, etc.).

Other repair costs were:

OK (repairs) at 0.34
Adj. (repairs) at 0.78
Partial at 1.65
General at 2.40
Diaphragms at 4.33
Condemned at 0.14

The above costs (as of January 1, 1932) were for the South Bend shop which employs the piecework system.

Since January 1, 1932, there has been a saving in labor cost of approximately 20%, and as a result of changing badges there will be an added cost of approximately five cents per meter. The above figures are influenced by the condition of the meters sent in.

The average freight cost to the different towns is 30c per meter.

An investigation some years ago revealed that the average cost for complete diaphragm repairs for a 5 Lt. tin meter in a small local town was $6.30 per meter. No concrete data is at present available as to what the meters repaired in the local towns did actually cost. Cost systems were different and it is impractical to really make a cost study of what repairs did cost as against what they are actually costing now in the central shops. The American Meter Company's last quotation to us was 4.80 per meter without freight for complete diaphragm repairs.

From the above figures, we can definitely see that we are getting good cost figures at the central shop which we could not hope to obtain at the local shops, and also that there is a considerable saving being effected by the great reduction in meter stocks and repair parts. I am even of the opinion that all repairs excepting OK's should be done at the central shops.

Advantages and Disadvantages

Summarizing the advantages and disadvantages of Centralization of Meter Repairs as experienced by us:

Advantages:

1. Reduction in meter stocks
2. Reduction in repair stocks
3. Better workmanship
4. Lower costs
5. More insurance of meters being sent out accurately
6. Uniformity in the repairing
7. Standardization of condemning.
8. Easier to study the meter conditions for the entire company
   a. Period for removal
   b. Period for diaphragm repairs
   c. Period for condemning
9. Accurate tabulation of meter repair costs is more closely attained
10. Better prices can be obtained for remelted solder, condemned meters, etc., due to larger quantities and less wastage.
11. In a large shop better equipment can be more easily justified.

Disadvantages:

1. New badging of meters on initial trip to shop adds slightly to the cost
2. Transportation costs
3. Local towns may receive poorer meters than they sent in.
   This latter point can be controlled by the central shop superintendent.

Traveling Laboratory

THE Commonwealth of Pennsylvania's new traveling laboratory, said to be the most completely equipped field laboratory ever constructed, and now in use by the Department of Health, Bureau of Laboratories, stopped recently at the Broad and Arch street offices of the Philadelphia Gas Works Company long enough to permit installation of an Electrolux Gas Refrigerator. The purpose of the truck is to rush speedy service to afflicted areas of the Commonwealth suffering from plagues, water contamination, typhoid fever and casualties of a general nature. All authorities who have inspected the truck have proclaimed it the most complete mobile assemblage of scientific equipment in the United States for this type of work.

The truck which is capable of 50 miles per hour, can reach any part of the state within 20 hours. In addition to the Electrolux, the equipment of the laboratory includes a stove and water heater, all operated with compressed gas for which a month's supply is carried. It is fitted with every modern device for bacteriological and chemical analysis, including autoclave, water bath, high and low temperature incubators, sterilizing oven, microscopes, balances, glassware and all necessary apparatus, such as hot and cold running water, storage battery capacity sufficient for more than four days, and cable equipment to allow connection to power lines.

Most of the equipment is of Allegheny metal or chromium plated brass. All enamel parts are finished with duco lacquer. It is reported that the entire cost was in the neighborhood of $18,000.

The truck is supplied with gas from two large Pyrofax tanks located in each of the two rear corners. The water supply, both hot and cold is likewise supplied from positions immediately above the gas tanks. Water is circulated throughout the truck by a small electric motor driven pump.

A Smoothtop gas range is equipped with ventilated flues, temperature control and auxiliary electrical heating units. An Electrolux five-cubic foot model supplies all necessary refrigeration. A special copper tubing is wound around the chilliator and its content of water and alcohol is carried by pump down beneath the truck and over to bottom of incubator on left hand side where, in side coils, it maintains a low temperature in the bottom of a two compartment automatic temperature controlled incubator. The top of the same cabinet, fully insulated, is heated electrically for propogation of bacterial cultures.

The design and construction of this mobile laboratory was supervised by J. Cecil Rhodes, Chief Chemist, and Walter F. Heintzelman, epidemiologist of the Bureau of Laboratories of the Pennsylvania Department of Health.

With a crew of three men, the truck is capable of examining more than 200 specimens of water daily. When it arrives in one of the more remote sections of the state it is equivalent to placing a full-sized laboratory in that location. The benefit to the people is quite apparent. Instead of waiting in remote parts as long as four days for the return of a diagnosis from a city laboratory, the tests may be conducted on the ground immediately. Pennsylvania inaugurated the traveling laboratory in 1924, as a state matter, although the idea had been used before in the United States army.

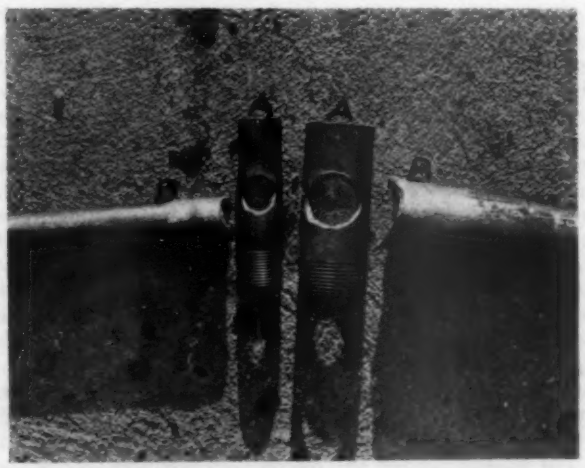
Notes on High Pressure Gas Distribution

DISTRIBUTION ENGINEER *outlines methods of connecting service to the main*

Welded Service Tee

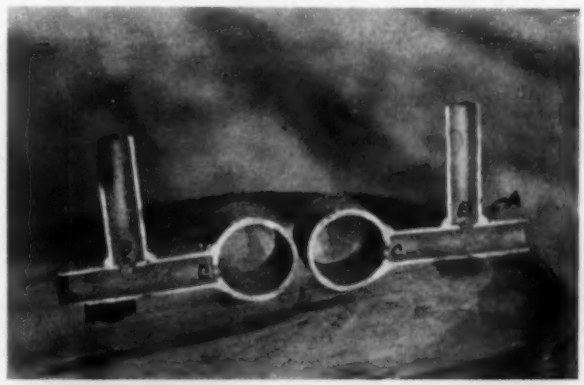
THE function of a service tee is to facilitate main tapping when installing services and to permit cleaning out the service or tap when necessary. Welded service tee construction can be made spare time work. On long services or those involving considerable breaking of concrete and during bad weather the welder finds sufficient time to weld a supply of service tees, thereby making special shop welders for this purpose unnecessary. The welder's work can be materially hastened by the shop cutting the few necessary nipples to proper lengths, threading the end of one to receive the coupling and plug and cutting or burning out the opening in the run of the tee.

A full opening the size of the bullhead should be made in the run of the tee. A templet may be used for accuracy and should allow for an opening slightly greater than the size of the outside diameter of the bullhead of the tee. Where no templet is available, as in the field, the helper holds a piece of pipe the size of the bullhead against the run and the welder marks the opening. When burning out the opening, it is impossible to perfectly bevel the edges on smaller sizes of pipe. An attempt is made to keep the opening so that there will be a minimum clearance between the two parts of the tee requiring no excessive welding fill. It is necessary even on ¾" tees to concave the bullhead end to approach as near a theoretically perfect intersection as practical.



Parts of Welded Tee; AA—Run, BB—Bullhead

It is advantageous to have the two parts of the tee separated by a slight amount except at the two points where they necessarily abut, as the separation will substitute for the imperfect beveled edges allowing a full penetration. The slight clearance between the two sections of the tee can be easily filled in while welding without impairing the strength. The bullhead is slightly tacked to the run at two opposite sides of the intersection before proceeding with full welding. There is no advantage in securing a perfect right angle between the two sections as slight offsets are corrected by bending the service or slightly offsetting the service joints. Playing the flame on or near the threaded end of the run during welding should be avoided, as overheating forms scale and thereby ruining the threads.



Cross Section of Welded Service Tee; A—Decrease in pipe wall thickness due to welding. B—Burned opening in run, C—Drilled tap in main

A cap or coupling used on the threads during welding is difficult to remove due to expansion, but if used, it should have oversize threads to accommodate this expansion. With slight experience a welder can avoid damaging the threads without the aid of either coupling or cap by confining his flame to the weld, using the smallest tip consistent wtih speed and dipping the tee in water immediately after completing the weld.

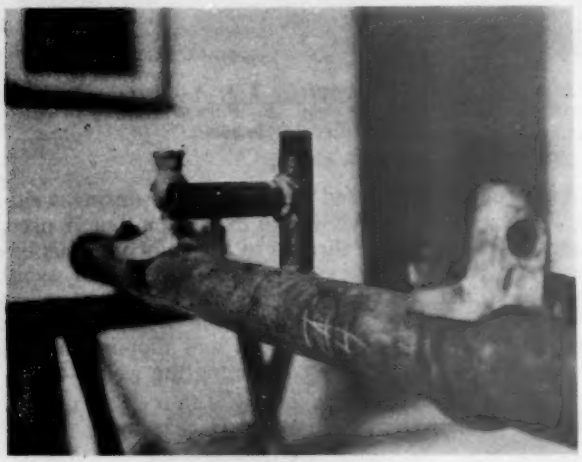
Extra Heavy Pipe Not Necessary

The use of extra heavy pipe on just the run of the tee for added strength has been advocated, but the experience of numerous companies has proved standard weight to be satisfactory; however, where extra heavy pipe is used for the entire service, it should be used on all parts of the tee. Through fear of failure of the tee the use of an extra heavy pipe for the run of the tee is sometimes practiced for added strength. The present art of welding assures full strength field joints as reliable practice and therefore, the added cost involved in using other than one weight of pipe is not justified. Yet, there is an advantage in extra heavy pipe on the run of the tee, as it aids in the welding of the tee to the main. It is usually more difficult to secure the proper heat on the main itself, which is surface welding, than on the end of the tee, which is end welding; further, the extra heavy pipe slightly retards the melting of the tee thus giving the welder a better opportunity to melt

the metal of the main. This advantage is lost to a considerable extent as the size of main increases above three inch, because the wall thickness of the main increases beyond that of extra heavy service pipe.

The real difficulty in welding is securing proper penetration of the puddled metal into the main wall without decreasing the wall thickness of the service tee at the periphery of the weld. An extra heavy nipple has the advantage that a possible decrease in wall thickness at the edge of the weld would still leave a wall thickness equal to that of standard weight pipe. A decided disadvantage is the necessity of carrying different weights of pipe in stock and having them accessible on a job when necessary; also, extra heavy service pipe does not give the same wall thickness as standard weight mains. If an extra heavy pipe is used on the run it should be used on the bullhead to standardize as far as possible and simplify welding work on the tee. Extra heavy pipe on the tee and standard weight on the service will offer little difficulty in welding because of the different diameters, since this difference is slight and not a factor in butt joints.

Some companies braze the service tee onto the main to save time and avoid the possibility of burning through the main wall; however, experience has proved that trained welders do not burn through the main, and that the use of dissimiliar metals is still experimental. It has been impossible to secure a full strength joint under the conditions of a service and main intersection with brazing; nevertheless, development along this branch of welding has led to a recent announcement of a rod for brazing steel to steel which will give the full strength of steel. Attention is again called to the attainment of simplicity.



Completed ¾ inch Welded Tee

The dimensions of service tees have been developed by experience. The minimum distance between main and bullhead on all sizes of pipe should be 1¼". A 3½" total length of nipple on the run was tried but it has been found that on ¾" services 4" should be used as a minimum. No set rule of dimensions can be given, as field conditions determine design and give welding a decided advantage of flexibility. However, the distance on all sizes of tees from main to service should be kept as near the minimum distance of 1¼" as possible which provides the welder with sufficient clearance for proper handling of his torch. The distance from top of bullhead to the threads on top of the nipple should be a minimum of 1" on ¾" pipe, 1¼" on 1¼" pipe and 1½" on 2" pipe, which distance will prevent burning of the threads through conduction of heat by the pipe itself. In city work especially, some companies lengthen the distance between main and bullhead to overcome obstructions encountered along the service.

Tapping with Drift Pin. Existing Taps enlarged by this method

The movement of the service in any direction tends to move the run of the service tee which is not free to move and, therefore, must internally absorb the imposed stress in the run of the tee. The resultant stress will be a maximum at the point of tee and main intersection and because of the lever principle this stress is increased as the distance between the main and bullhead is increased. A preferable method where practical, therefore is constructing the service tee to keep the distance between the main and bullhead to a minimum and placing bends in the service adjacent to the tee which relieve future stresses to a large extent by actual movement.

Pressure in Main Not Hazardous

The welding of the service tee to the main with pressure in the main offers no mechanical difficulties to an experienced welder, but at first a welder fears completely burning through the main wall, so he should be shown by an actual burning through of a pipe filled with gas that an explosion does not result and that it can not happen if the main contains only gas and not a gas-air explosive mixture. A welder burning through the main, for some reason such as a deep pit or fault in the pipe metal itself, will find that the hole is small in size if the torch is immediately removed. The closing of the hole depends on its size, as a pin hole is closed against pressure with a cold chisel but a large hole requires plugging with a pin made from a welding rod or a piece of steel, after which welding is resumed. Where the hole is too large for any of these methods a small piece of pipe or coupling is welded to the main concentric with the hole and a plug inserted.

The reason for the infrequency of burning through a main wall is the greater difficulty of melting the surface of the main as compared with the tee end. The welder must use discretion in locating the tee on pitted mains to avoid pits that extend more than half way through the wall of the pipe around the circumference of the tee as a precaution against burning through. The main at the location of the tee should be scraped and thoroughly wire brushed to eliminate any inclusion of foreign matter in the finished weld which would

weaken it. Any deep pits in the exposed section of the main should be spot welded.

The size of tip used on welding service tee to main is usually the same number five or six used on the pipe joints, but where obstructions cause the welder to assume awkward positions, a number four tip is used, slowing up the rate of welding and producing a more satisfactory weld.

Side Connection—In place of a tee the practice of attaching the service pipe directly to the side of the main is sometimes followed. This has a limited scope of application as it can be done only before the main is gassed or by valving off the main and draining the gas. It necessitates an overhead weld at the main, thus requiring much larger trenching and in maintenance work offers no opening through which the service can be blown or washed out, except from the cellar or by cutting. This blowing or washing out is important should a pluggage occur any place between the main and meter cock. The lower service take-off from the main, however, does allow a few added inches grade to the service.

Usually where side connections are used services and main are welded together as a unit above the ground and then lowered into the trench, but this offers the possibility of leaving strains in the services, as the service would be a secondary consideration in grading. A side connection does not offer any stronger connection to the main than a tee and has the possibility of less strength, since the awkward position assumed by the welder during the overhead welding may cause burning into the service too deeply, decreasing its wall area more than usual at the edge of the weld. A method less frequently used is that of welding a coupling to the side of main, tapping, then using a threaded connection. This threaded connection would have the disadvantage of screw threads and these threads would be at a point of maximum stress resulting from perpendicular or sidewise service movement caused by ground changes. A long piece of pipe increases the difficulty of catching the thread "on the fly." "On the fly" is a phrase which is used to designate gas blowing free while making connections.

Plate Welded to Main—Some companies weld a plate to the top of the main for adding physical strength to the main at the service connection. The service tee or coupling is then welded onto the plate or it is tapped and threaded to receive the service connection. This tapping and threading requires the use of a rather thick plate which welding heat tends to warp, causing questionable security on smaller size mains. Experience has demonstrated satisfactory results with simple construction and there is no added advantage in welding a plate on the main which requires considerably more time than a welded tee.

Coupling Welded to Main—To eliminate the disadvantages of clamps some prefer to weld a recessed coupling to the top of the main. Difficulties are encountered in the prevention of damage to threads from the heat of welding. A plug is loosely screwed into the coupling which is then welded to the main, but a coupling sufficiently affected by welding heat often makes it impossible to remove the plug without breakage.

Once the weld has cooled below cherry red it is advantageous to pour water on the coupling to prevent the heat spreading to the outer threads as much as possible. Since it is necessary to have a welder for the purpose of installing this coupling, it would appear logical to make a complete welded service. Threads affected by the welding heat may receive a fitting but future removal is prohibited in the majority of instances, as heated threads rust quickly. Where the threads are badly affected the whole coupling should be cut out instead of welding another coupling on top of the original. Even the slight unavoidable heat which reaches the threads may result in their damage and more frequent leaks. If for any reason a wrench must be placed on the coupling heavy pressure should not be exerted or the coupling will be bent eliptical, preventing proper entrance of a fitting.

Disadvantages of Anticipating Service Locations

While laying mains some weld couplings on at probable locations of services, which locations may be determined by existing dwellings or by placing couplings at certain positions in front of each lot. The consequent numerous plugs add to the possibility of slight leaks which are seldom detected until they cause property damage, and totaled, are a factor in unaccounted-for gas. In place of a plug some use a corporation cock and plug which increases cost and leak possibilities. Few have continued the policy of installing couplings when laying the main, as it has its disadvantages.

Installing the couplings at probable service locations before the owner or resident has declared interest by application seldom results in a satisfactory location. Running service pipe parallel to the main from the coupling location neutralizes any saving and adds to the difficulty of maintenance, leak detection, location of curb cocks if used and requires more detailed records. Within the usual limits of proper location from a utility standpoint it is well to have the consumer decide the location of service and meter without the additional handicap of a tap already in place. Highway improvements may place the couplings in unusable positions.

Service Tap—The size of the service tap is seldom a factor in service capacity, being similar to an orifice; yet, other considerations indicate advantages in large size taps, for a slight amount of tar, gum or other foreign material may plug a $\frac{3}{16}$" tap. While gum pluggages in a $\frac{3}{16}$" orifice have been known to resist 125 pounds pressure the use of a ½" tap in a ¾" service has proved a decided advantage in the elimination of this source of trouble.

It is contended that large taps will subject house governors to sudden pressure changes. The reverse of this is true because with a very small tap there is a higher differential across the opening during consumption, and when the load is shut off a quick building up from a service pressure to main pressure occurs; but there is no water-hammer effect in the transmission or distribution of gas, since there is in water. Granting that governors are subjected to changes in pressure, the differential pressure with large taps is sufficiently small to prevent straining the governors, valves, or diaphragms. A small tap causes a high gas velocity at the tap, thus increasing the foreign material carried into the service.

The preferable method for making the tap is by means of any high pressure tapping machine which prevents the escape of gas during tapping. The tapper must exercise caution in drilling to completely penetrate the main wall. When only the tip of the drill penetrates the main poor pressure results, the cause of which is costly to locate. To determine whether a complete tap has been made the drill should be worked up and down in the tap before removing the machine. After taking the tapping machine off, the gas should be allowed to escape until no foreign matter can be seen in the gas stream.

No difficulty is experienced with pressures up to

seventy-five pounds in catching "on the fly" if the curb and meter cocks are left open during this operation to relieve pressure. When pressure must be relieved through the cellar every precaution must be taken that is followed ordinarily when gas is handled inside of a house. It is a simple matter to run a temporary line or hose from the meter cock to the outside of the building, so that not only foreign matter but any condensate laying in the main will be carried outside. There are tapping machines on the market designed to allow removing the drill and swinging into place and tightening the coupling and plug, cap or corporation cock without catching on the fly, but they should be designed to allow removal of foreign matter by blowing.

Another method of tapping is with a drift pin. Before the tee or saddle is placed on the main a center punch should be used at the center of the proposed tap to guide the drift pin. The size of the tap is determined by marking on the drift pin various distances corresponding to desired diameters of tap and driving the pin until the desired mark reaches the top of the fitting. Care must be taken in this method to prevent the pin blowing out of the tap and injuring workmen. The disadvantages of this method, aside from safety, are that should the pin be drifted into a pipe seam it is apt to cause a run in the seam; lack of accuracy in the size of the opening; jagged projections in the main; the hazard of driving the pin through the opposite wall on small mains and in limitation of tap sizes.

On services installed before gassing the main, the quickest method is burning an opening in the main before welding on the tee. The opening in this case should be made full size not only to prevent beads of metal projecting into the opening and decreasing its size, but also to take advantage of butt welding over that of butt to surface.

Screw Joint Service with Slip Coupling to facilitate Installation

Screw Joint Services—Complete screw joint services alter the method of installation. A policy to be decided is whether the use of slip couplings or unions is to be sanctioned. Experience on high pressure gas has eliminated using unions or long screws on any sub-surface work and in a majority of cases on any lines conducting high pressure gas. Slip coupling usage increases installation costs, is an additional source of leakage and adds to the total of detail records since their location should be carefully recorded. With the use of slip couplings the simpler parts of the service are installed later tieing them into parts more difficult to prepare, which on many services requires using more than one coupling. Slip coupling use has found only a limited following on service work.

Practically all joints must be connected in the trench on a complete screw joint service, since the service must progress from the main clamp to the meter cock. As previously pointed out, the location of the main and making the service tap commonly delay service installation. This is the first work which must be finished on a complete screw connected service. Screw joints are weak links in a service, not only from a physical standpoint but also they are the first points of corrosion.

High Pressure Tapping Machine

It has been found by experience that screw fittings following the main clamp or tap are a frequent source of leakage. It is difficult to make them up into a permanently tight joint, being a fitting on which a wrench does not grip readily.

What Constitutes a Good Thread

Considerable educational work should be carried on with the fitters so that they recognize the characteristics of a good thread and how to make it into a tight joint. A common attitude among fitters is that the tightness of a screw joint depends on the joint compound used. The joint compound's only use is as a lubricant for easy assembling and disassembling pipe and fittings. The real test of a fitter's ability in cutting a thread is making up a number of joints which will be gas tight without the use of any compound. If the size of a company does not warrant a continuous inspection, the checking of threads should be the duty of a foreman or superintendent who should carry standard thread gauges. A common fault is that of too deep and too many threads.

The use of joint compounds should be closely watched to guard against excessive use and to see that it is placed only on the male thread. Dipping the threads in compound should not be sanctioned, for too much compound is put on them and as a result, some of it gets into the pipe. Any compound getting inside the pipe through excessive use or through placing on the female thread would add that much additional undesirable foreign material. Lavish use will result in a tight test at the time of installing the service but gradually develops a leak. This is illustrated on almost any high or low pressure screw pipe work in cellars where the compound gradually works out of the joint and forms a roll or bubble around the edge of the joint. If the compound does not harden quickly a leak will occur and where it does harden it may later crack with the same result.

The compound used should resist the solvent effect of any condensates. There are compounds on the market that will resist many of the oils but which are dissolved by water. Again in dehydrated gases and natural gas the abundance of compounds must be prevented, as the drying property of the gases will result in leaks.

Consideration should be given to the nature of gases which might be carried by the line in the future as well as the present in selecting joint compounds. A com-

pound that would be satisfactory in the moist conditions within a short distance of a plant would be advantageous and make practically all joint compounds satisfactory. Alter these conditions by dehydration, mixing with other gases, shutting down the plant and receiving gas from a distant plant, which gas would be very dry, or securing natural gas, and the joint compound would be materially affected and constitute a possible source of leakage.

(Continued in January issue)

Survey of Explosion Hazards in Manholes

G. W. JONES

Chemist, U. S. Bureau of Mines,
Pittsburgh Experiment Station

A SURVEY of explosion hazards in manholes owned by the Edison Electric Illuminating Co. in the City of Boston and 29 other contiguous towns was continued during the year 1931. The survey was conducted by the Edison Electric Illuminating Co. and the Consolidated Gas Co., both of Boston, in cooperation with the United States Bureau of Mines. In addition to the Edison territory covered by the mains of the Boston Consolidated Gas Co., additional tests were made in Edison territory supplied by other gas companies.

The tests were conducted along the same general lines followed in a similar survey in Boston during 1929-30, the results of which were issued as Bureau of Mines Report of Investigations 3109, entitled "Gases in Manholes: A Survey of a Utility in Boston, Mass.," by G. W. Jones and G. St. J. Perrott, and to which reference should be made as to results obtained in this first survey.

Experiences obtained in the first survey warranted a few changes in test procedure which may be enumerated as follows: A test car was designed especially for the work. Particular attention was paid to the protection of the men from traffic hazards; details of the car can be obtained from the body of the report.

The charcoal filter test was added as a standard routine procedure for all manhole atmospheres which when tested with the detector in the usual way showed combustibles to be present. Both laboratory and field tests have shown this test to be valuable in determining whether combustibles in a manhole atmosphere are heavy hydrocarbon vapors such as gasoline or the more permanent combustible gases such as hydrogen, carbon monoxide, methane, ethane, and illuminants.

The survey during 1931 extended over a greater territory, and a far greater number of manholes were tested than during the 1929-30 survey. In the earlier survey 1,765 different manholes were tested during the year and 4,068 individual tests were made; during the year 1931, 9,210 different manholes were tested and 13,068 individual tests made. During the 1929-30 survey each manhole was tested on an average of 2.3 times during the year; in the present survey they were tested only 1.4 times; thus in the present survey a far greater number of manholes were tested, covering all districts in which the Edison company operates.

Tests made during the 1929-30 survey showed that 6.2 per cent of the manholes tested gave indications of combustibles at one time or another during the year, while in the present survey only 2.7 per cent were found under similar conditions. Thus the results show a marked improvement in conditions since the tests were started in 1929 and indicate what may be accomplished in other cities provided similar surveys are carried out.

The report gives the composition of all manhole atmospheres which showed combustibles to be present by detector tests. Samples of these manhole atmospheres were taken by the test crew and shipped to the Pittsburgh Station of the United States Bureau of Mines for complete analysis. Briefly, the composition of the constituents present in these samples varied over the following range:

	Per cent by volume
Carbon dioxide	0.0 to 16.6
Illuminants	0.0 to 3.9
Oxygen	1.0 to 20.5
Hydrogen	0.0 to 20.5
Carbon monoxide	0.0 to 3.8
Methane-ethane	0.1 to 34.7
Gasoline vapor	0.0 to 0.6
Nitrogen	36.6 to 83.7

The majority of the samples showed carbon monoxide to be present and many showed proportions which would be fatal to workmen should they enter the manholes without being properly protected. Likewise, many samples were found to be low in oxygen content; some so low in fact that workmen would be quickly overcome should they enter without protection. In one sample the carbon dioxide content equalled 16.6 per cent, a very dangerous concentration from the standpoint of health.

Records were kept relative to the barometric changes during the survey to determine whether such changes affected in any way the tendency of gases to accumulate in manholes. The results obtained during the 1931 survey indicated that the tendency for combustibles to accumulate in manholes is greater when the barometer is stationary (does not rise or fall by an amount greater than 0.1 inch of mercury per 24 hours) than when the barometer is rapidly rising or falling.

Tabulations to determine the time of year that combustibles are most liable to accumulate in manholes showed that the greatest number of manholes with combustibles were found during July; the next highest number for any given month was that of February. Also, for these two months, the percentage of days in which the barometric pressure was stationary, slowly

Reprinted from U. S. Bureau of Mines R. I. 3192, "Investigations During 1931 of Gases in Manholes in Boston, Mass."

rising, or falling was also higher than for months immediately preceding or following.

A general survey of the constituents present in manhole atmospheres showed three kinds of contaminations:

1. Gases containing hydrogen, carbon monoxide, illuminants, methane, and ethane. Because of the presence of hydrogen and carbon monoxide and other constituents given above these contaminations were attributed and usually proved to be manufactured gas, which found its way into manholes from leaks in gas mains, services, and other sources.

2. Gases containing abnormally high percentages of carbon dioxide, varying amounts of methane and low percentages of oxygen. These mixtures usually offered no special hazards from explosions. The most of these mixtures were found to be nonexplosive either when air or when combustible propane gas was added. In the past these mixtures have been termed sewer gas for the want of a better name, and because such mixtures are often found in sewer atmospheres. In this report such mixtures have been termed soil gases because from the results obtained in this investigation such gases appear to be the reaction products between normal air and oxidizable constituents in the soil. Many of these mixtures contained rather large percentages of methane as the result of fermentation or decomposition products of organic material in the soil.

3. A few of the samples showed the presence of heavy hydrocarbon vapors. When these heavy hydrocarbon vapors were found in manhole atmospheres, they were always associated with other combustibles such as those from manufactured gas or soil gas, and in no cases were these vapors present in amounts sufficient to produce explosive mixtures.

Contamination from more than one source was found in most of the samples analyzed, so that there usually was no sharp dividing line between the three classes.

The second year of the cooperative investigation has clearly demonstrated the value of cooperative, systematic, and continuous manhole testing, not only from the standpoint of public safety, both to life and property, but to the early locating of unseen defects under sealed pavements. Spasmodic and poorly supervised test work is of little value to any company. The plan of test campaign should be carefully thought out and carried out with the highest degree of efficiency obtainable. The value of joint investigations of gas and electric companies is increased many fold when it is cooperative work. In fact, ideal conditions would be for all utilities and municipalities, to engage in a joint cooperative test work on all underground conditions.

In the matter of assigning men for the work care should be taken to pick men of experience who will show a conscientious interest in the work in hand.

One of the keynotes of cooperation between companies is the prompt investigation and necessary temporary or permanent correction of defective conditions. The work for 1932 is continuing and at the end of the calendar year a further report will be made.

Pacific Coast Gas Statistics: Third Quarter of 1932

THE accompanying tabulation covers gas company operations for the months of July, August and September only. This quarter year is presented alone because the summer period is not greatly affected by temperature conditions and therefore reveals the normal trend more accurately than if the abnormally cold winter months of January and February, 1932 were included.

For the States of California, Arizona, Nevada, Oregon and Washington, and the Province of British Columbia

	1931	1932	Percent Change
Production—Mcf.			
Water Gas	685,301	626,302	
Coal Gas	336,967	340,088	
Oil Gas	1,517,903	1,476,452	
Coke Oven Gas	159,331	158,619	
Butane Gas—550 B.t.u.	32,892	38,348	
Natural Gas Purchased	36,698,186	27,623,621	
Total	39,430,580	30,263,430	—23.3%
Active Meters—Sept. 30			
Domestic	1,548,798	1,521,003	— 1.8%
Commercial & Industrial	65,755	67,074	+ 2.0%
Total	1,614,553	1,588,077	— 1.6%
Sales—Mcf.			
Domestic	9,512,566	10,208,295	+ 7.3%
Commercial & Industrial	24,822,250	15,266,894	—38.5%
Total	34,334,816	25,475,189	—25.8%
Gross Revenue			
Domestic	10,506,239	10,958,951	+ 4.3%
Commercial & Industrial	4,864,238	3,423,001	—29.7%
Total	15,370,477	14,381,952	— 6.4%
Miles of Main—Sept. 30	25,078	25,914	+ 3.3%
Number of Employes—Sept. 30.	11,461	11,826	+ 3.2%

There was a reassuring increase in the California domestic business and but small recessions in other sections. Commercial and industrial business has, however, continued to drop sharply, particularly in California.

For the first quarter of 1932, California commercial and industrial sales were off 25% but total sales showed an increase of 0.9% because of an increase of 29.9% in domestic sales due to abnormally cold weather in January and February, 1932. At the half year, domestic sales in 1932 were 23.6% ahead of 1931 and commercial and industrial sales 28.1% less, making total sales for the first 6 months of 1932 6.5% less than 1931. It should be pointed out that in 1931 large quantities of natural gas were consumed in steam-electric generating stations due to the unfavorable water conditions at hydro plants. This has not been necessary in 1932.

For the first 9 months of 1932 domestic sales are reported as 43,391,295 Mcf which is 20.2% above 1931. Commercial and industrial Sales are reported as 42,749,043 Mcf, 32.4% less than in 1931.

Total California sales in cubic feet for the 9 months period in 1932 are 13.2% under 1931 sales.

—Clifford Johnstone, Managing Director, Pacific Coast Gas Assn.

Scope of Oil Heating

WITH some one million families now employing automatic oil heating in their home, the fuel oil business is bulking large as a great new outlet for the products of the major oil companies.

The domestic fuel oil market now runs close to two-billion gallons a year. And this is only the start. With the oil burner industry only ten years old and some of the major home-appliance manufacturers entering the field, the oil burner looms as a secondary market to the automobile for petroleum.—*A. W. Clark, Managing Secretary, Dealer Div., Automatic Oil Burner Ass'n.*

Operating Test on A Cast Iron Pipe Line Under High Pressure

JAMES W. MOORE

Manager of Research, American Cast Iron Pipe Company, Birmingham, Alabama.

AN eight-inch, high pressure hydraulic line of Mono-Cast Centrifugal Cast Iron Pipe was installed in January, 1930, for the dual purpose of (1) testing Mono-Cast pipe under continuous high hydraulic pressure with excessive water hammer over a long period of time, (2) proving the Doublex Simplex (gland packed) joint under high pressure. It consisted of 18 lengths of Mono-Cast pipe and five cast steel tees. Of these 18 lengths, 17 were .60″ metal thickness (Class "D") and one length was .38″ metal thickness (Class 150) cast from standard Mono-Cast iron. See Figure 1.

Fig. 1—8″ Mono-Cast High Pressure Hydraulic Line. The high pressure line described in this report is shown at the right. The lines on the left are low pressure Bell and Spigot return lines.

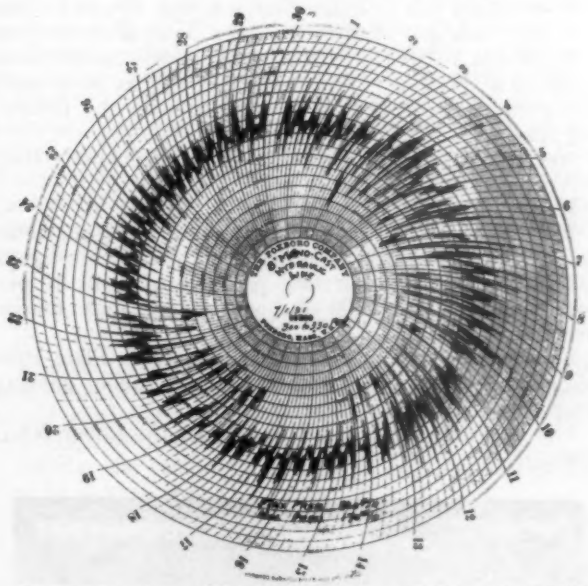


Fig. 2—30-minute Chart Taken from 8″ Mono-Cast High Pressure Hydraulic Line. Note the rapid and violent pressure surges (170 lb. minimum to 920 maximum). During the 23 months this line was in service, literally millions of water hammer blows were working on it, without weakening its physical resistance. Compare this chart with Fig. 2 (a).

The line was supplied by three vertical triplex plunger pumps set for 550 lb. per square inch, working pressure. Working off this line intermittently and continuously were 79 three-way quick opening hydraulic valves ranging in size from one inch to one and one-half inches, the rapid opening and closing of which caused surges ranging in pressure from 150 lb. per square inch to 1000 lb. per square inch. See Figures 2 and 2a.

Throughout a period of 23 months, this line was maintained in continuous and satisfactory operation 24 hours a day, after which it was decided to take up the line, and subject it to thorough inspection and destruction tests. As soon as the old line was removed, a new line was installed in its place for similar study; this new line is discussed later.

What the Inspection Revealed

Not a single leak had occurred in any of the Doublex Simplex joints. They were found to be extremely hard to disjoint when the line was being removed. In one instance it required four men using a 12-ft. steel rail as a lever, and six men pulling direct with a rope sling,

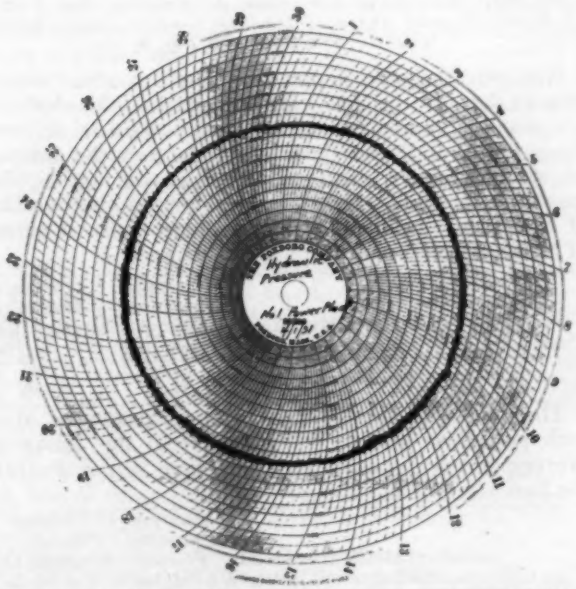


Fig. 2 (a)—Chart Showing Behavior of a Normal High Pressure Hydraulic Line. Compare this chart with Fig. 2.

to pull the joint apart. The Doublex Simplex gaskets had adhered completely both to pipe sockets and spigots.

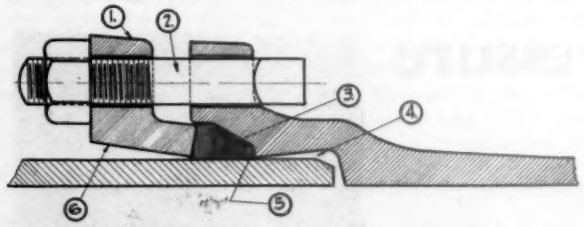


Fig. 3—Standard 8" Doublex Simplex Joint, such as was used in the original line. (1) Cast Iron Gland, (2) Sherardized steel Bolts, (3) Rubber Gasket (Fulcrum Point), (4) Flare in socket to Provide for Deflection, (5) Square Shoulder Providing Positive Seat for Gasket, (6) Flare in Gland to Provide for Deflection.

A cross section cut of the Doublex Simplex joint is shown in Figure 3 and cross-sections of the opposite sides of one of the gaskets from this line are shown in Figures 4 and 4a, which illustrate how this joint provides concentric assembly, with a minimum of gasket deformation.

What the Destruction Tests Revealed

To develop the physical properties of the pipe in this test line, it was decided to burst full lengths of pipe in a destruction test rather than to use test specimens. While test specimens or coupons cut from the walls of the pipe give a fairly accurate indication of the strength of the pipe itself, it was felt that they were not accurate enough to develop the data sought in this instance. Test specimens are subject to accidents of selection; bursting full lengths of pipe eliminates accidents of selection, because the bursting test finds the weakest part of the structure. See Figures 5 and 5a.

Fig. 4—Left, Cross-Section of Doublex Simplex Duck-Tipped Gasket, as it came from the line. Note deformation, and compare with Fig. 4 (a). This joint insures substantially concentric assembly with minimum deformation. Fig. 4 (a) —Right, Original Shape of Doublex Simplex Duck-Tipped Gasket. Compare with Fig. 4.

Not only the pipe in the test line, but also "sister" pipe to those in the line were subjected to this destruction test. A comparison of physical properties of these "sister" pipe to those which had undergone the millions of water hammer shocks and surges during the 23-month test period, shed valuable light on the question of fatigue of the metal. The average physical values of these "sister" pipe were as follows:—

Class	Ave. Metal Thickness	Min. Metal at Break	Bursting Pressure, Pounds Per Sq. Inch.	* Ultimate Tensile Strength, Lbs. Per Sq. In.
150	.38"	.36"	2120	24500
"D"	.64"	.60"	3140	20300

That the pipe showed no tendency to fatigue after such punishing service is evident from the following average physical qualities of the pipe removed from the line after 23 months' service:

Class	Ave. Metal Thickness	Min. Metal at Break	Bursting Pressure, Pounds Per Sq. Inch.	* Ultimate Tensile Strength, Lbs. Per Sq. In.
150	.38"	.35"	2300	27400
†D	.65"	.62"	3250	20311

A new test line with all salient physical properties determined, has been installed to replace the installation reported on in this article. This new line consists of Mono-Cast Doublex Simplex Cast Iron Pipe, and the cast steel tees in the original test have been replaced with alloy cast iron Doublex Simplex tees. The pipe thicknesses are less than we would recommend at this time for similar working conditions but were purposely on the low side to develop any tendency toward failure.

Fig. 5—One of the 8" Doublex Simplex pipe (.60" metal thickness) Before Being Tested to Destruction.

Figure 6 shows diagramatically the layout and description of each pipe and fitting in the new test line. Eight-inch Class 150 pipe is .42" nominal metal thickness and is regularly furnished for 150 pounds per square inch water working pressure. Class 250 pipe is .50" nominal metal thickness and is regularly furnished for 250 pounds water working pressure. The pipes marked "Special Iron" contain alloys to increase the physical properties.

The new line is composed of the following:

3—8" Cast Iron Doublex Simplex Tees—Special iron
5—8" Class 150 Doublex Simplex pipe—Regular iron
8—8" Class 250 Doublex Simplex pipe—Regular iron
5—8" Class 250 Doublex Simplex pipe—Special iron

Three 8" Tees cast from the same metal as those used in the line were tested to destruction with the following results:

Average bursting pressure—2350 lb. per square inch
Average metal thickness —.78"
Minimum metal thickness—.58"

Four 8" Class 250 pipe cast from the same metal as that of the special iron pipe that were used, were tested and had an average bursting pressure of 3840 lb. per square inch and 32,500 lb. per square inch tensile strength.

All the pipe and fittings were uncoated. Plain rubber, duck-tipped rubber and lead-tipped rubber gaskets were used.

The new line was placed in service December 30th, 1931.

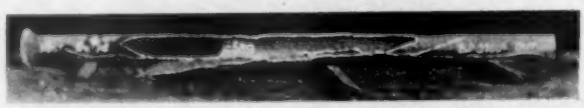


Fig. 5 (a)—Pipe shown in Fig. 5 after being Tested to Destruction.

It is contemplated that at two to three year intervals various lengths of pipe from the new line will be removed, subjected to the destruction tests, and the physical properties carefully checked against the original values. In the meantime, it is felt that the information developed in the original test, coupled with the long and satisfactory service record of cast iron pipe in underground piping systems, justifies the use with confidence of Mono-Cast Doublex Simplex Cast Iron Pipe

* Computed by formula PD = 2 St
Where P = bursting pressure, in pounds per sq. inch
D = actual internal diameter in inches
t = minimum thickness (inches) on line of fracture
S = ultimate tensile strength—pounds per sq. in.
† .60" nominal metal thickness.

for high pressure oil and gas transmission and field line service, especially in those areas where corrosion is a serious menace to the life of other ferrous piping materials.

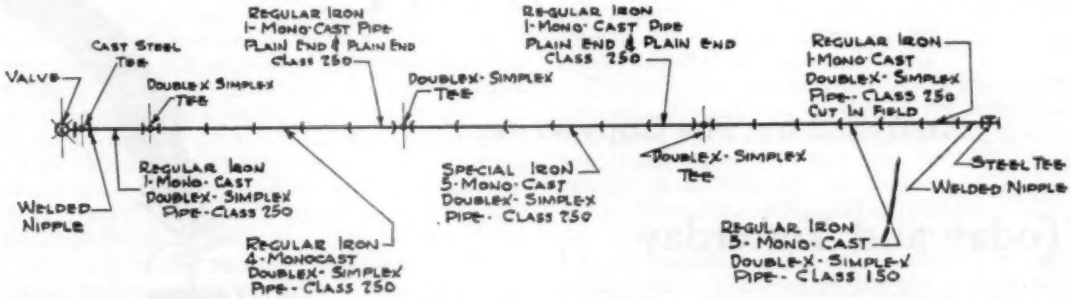


Fig. 6—Layout and Description of New Doublex Simplex Cast Iron Pipe Test Line Which Replaced the Line Reported On In This Paper.

Principles of Recuperation Applied to Industrial Gas Furnaces

(Continued from page 12)

corrosion-resisting materials must be employed for burner construction, where high preheats are involved.

During the experimental work conducted in this investigation it was found that slightly greater noise was emitted by the furnace when operating with preheated air than with air at room temperature. This has been attributed to the increased ignition velocity of the air-gas mixture. However, an extensive research problem entitled, "The Elimination of Noise in Industrial Gas Burners," likewise under the supervision of the Committee on Industrial Gas Research of the American Gas Association, is progressing rapidly, and it is believed that when terminated, it will yield additional information concerning the effects of preheated air on the noisiness of industrial furnace operation.

Conclusions

Recuperation as an agency for effecting plant economies constitutes a familiar but relatively unstudied phase of gas utilization. It deserves thoughtful scrutiny from both theoretical and practical viewpoints.

Briefly, the results of the Laboratory's investigation may be summarized as follows:

I. Heat introduced into a furnace by preheated air may be utilized in three principal ways.
   - A. The gas rate and furnace temperature may be maintained constant and all of heat in the air thereby made available for heating more work, i.e. the rate of production may be increased.
   - B. The amount of work and gas rate may remain unaltered and the additional heat utilized in elevating the furnace temperature.
   - C. The gas rate may be reduced so that both the furnace temperature and quantity of work remain fixed, and the heat in the air may affect gas savings.

II. The formula presented in this paper for calculating the gas savings resulting from burning gas with preheated air has been shown, by extensive experimental tests to be valid for neutral, reducing, or oxidizing atmospheres for any gas, for any furnace, and over the entire temperature range of industrial gas furnace operations and air preheats.

III. To obviate the hazard of preignition, 1,000 degrees F., is recommended as the maximum safe air temperature to be used with premixing burner systems.

IV. Since ordinary iron or mild steel seems to oxidize rapidly in contact with air at temperatures above 800 degrees F., the use of heat and corrosion-resisting materials or alloys for the construction of recuperator elements, air lines, and burner tips is recommended if highly preheated air is to be employed.

V. In average recuperative installations it seems to be uneconomical to attempt to obtain air temperatures in excess of 60 per cent of the flue gas temperature. However, this figure is only approximate and should be tempered with good engineering judgment since individual factors may greatly affect it.

With the work outlined in the bulletin and summarized in this paper, research at the American Gas Association Laboratory on the "Characteristics of Burning Gas with Preheated Air" is terminated. However important considerations closely allied to the subject are embraced in other projects fostered by the Committee on Industrial Gas Research and will be treated as a part of those topics at a later date.

It is believed that the bulletin entitled, "A Study of the Characteristics of Burning Gas with Preheated Air," recently issued by the Association contains the most complete data, both from a scientific and practical standpoint. Its value to the industry, however, will depend upon the extent to which the information contained therein is studied and applied.

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Effective Advertising Appeals

Analyzed by The Copywriter

Today and Yesterday

EXPERIENCE tells us to be cautious in comparing the conveniences of today with the hardships of the "good old days." People are touched with nostalgia for the times that used to be. They are quite apt to retort, when you picture the contrast, "If this be civilization, I'll take my chances with the mauve decade or some other period." There is, after all, a certain charm about bygones that cannot be dissipated entirely by the brightness of mechanical perfection. The only way most people can be led to appreciate the difference is by having lived it in person.

This thought should be a guide to any gas advertising that attempts to deal with this theme. Situations used for purposes of comparison should be real, not fantastical. The modern counterpart should not make the mistake, which often occurs, of merely providing an escape from domesticity—too frequently confused with "drudgery." The "leisure" made possible by modern automatic contrivances should be turned to good account, not merely conceived as a long-awaited opportunity for repeated afternoons of golf or bridge. No quantity or degree of cleverness of advertising can make us believe that the average woman has waited these thousands of years to be released from the chains of housework just to be able to bid four spades or tee off from the club house at two o'clock each sunny afternoon. If that were true, we would be fighting in vain against the can-opening homemaker and the delicatessen wife.

One of the most intelligent ways of illustrating the extent to which modern gas appliances have improved living conditions is to show some of the various stages which mankind has improvised to meet certain requirements of life. Museums and libraries have been combed to furnish copy for the story of water heating alone. "An up-to-date water heater of a century ago" was found in the Louisiana Historical Museum in New Orleans. This heater, an enclosed funnel-like affair with two chimney vents extending up the sides, was filled with hot charcoal and placed in the bath water until the latter was brought to a comfortable temperature. Another famous water heater that was a "forerunner of hot water luxury" was the American-made heater of Adam Thompson, of Cincinnati, who had an unwonted desire for cleanliness far beyond the custom of his time. The water was carried in buckets to a tank on the roof from which it ran through a coil around the chimney to the tub. That was in 1852, when, as the advertisement states, "there was no faucet marked 'hot.'" Today, "health and cleanliness go together" since hot water is always available at the turn of the tap.

Horseless carriage of 1898
—Just as old-fashioned as waiting for hot water
Automatic Gas Water Heaters give instant hot water
Times change. Old methods give way to modern convenience and efficiency.
An Automatic Gas Water Heater gives instant hot water—day and night. It requires no attention. No waiting. It keeps plentiful hot water always ready for bathing, shaving and the laundry. Here's a necessity that you need in your home. And the cost of this service is the lowest—about one-fifth of a cent per gallon.
Details on replacing your old water heater with an Automatic Gas Water Heater and facts about our Special Offer can be obtained from our Representative by phoning our local office. Or—
Send for further advice—
Mail to local office of Pacific Gas and Electric Company.
Gentlemen:
Please have your Representative tell me about your Special Offer on modern Automatic Gas Water Heaters. This does not obligate me in any way.
Address
Name
City
Pacific Gas and Electric Company
P·G·and·E·

This Newspaper Ad Did a Good Job

Other Makeshift Water Heaters

In listing improvised water heaters we must not forget the tea-kettle on the stove, and even before that the great pot hanging on the crane in the fireplace. "The Good Old Days" Are Gone! we are reminded by one advertisement which tells how grandfather had to chop his way down to cold water in the morning before he could wash; and how, when he heated water in the tea-kettle it was for thawing out the pump rather than for shaving. A hundred years ago hot water was carried where it was needed—which leads to the question "Are Log Cabin Methods in Your Modern Home?" "Times Change. . . ." as witness the familiar waterback connected to the coal stove. What a chance for a wood cut engraving by John Held, Jr.! Even the intermittent hand-operated gas heater can be made to look as out-of-date as the bustle—though they do tell us the latter is coming back!

Turning to the gas range of today, we find an almost endless variety of antecedents, all of high suitability for advertising, of which we have space here to mention only a few. Roasting over an open fire was "a boon to

primitive man," for it brought comfort, protection, and cooked food—three of the principal attributes of modern gas service. The Indian's abode was likewise his cookstove, hence the characteristic design of the wigwam with its open top and smoky interior, which makes one wonder how the red man ever preserved his eyes to spot a deer. In the Middle Ages cooking was done in a crude circular stove with its attendant smoke dirt, heat and work—actually worse than the wigwam, for there was no chimney or outlet of any kind. In those days the cook was certainly "cooked" with a vengeance! When the chimney finally came into being, it brought with it the huge fireplace which was used for spit roasting and, later, for baking and other purposes in American colonial homes. The modern broiler and oven with its regulator and clock control stems directly from this fireplace cookery which was in vogue until sometime after Washington's day.

Heating is another interesting chronicle which it is not necessary to go into further at this time. The principle of refrigeration goes back, not merely to the ice man of recent memory, but to the "old oaken bucket that hung in the well." The old well gave an "extra service," according to the advertising slogan. "In its depths the rotund watermelon was cooled—the butter dripped beads of chilled crystal. . . . Wells were the source of water, surely—but they gave an Extra Service as the countryside's refrigerators."

Your reader's own memory is loaded with memories, pleasant and otherwise, which can be tapped to good effect by the canny advertising writer. "Remember the old swimming hole?" the traditional symbol of childhood days in this country. It is gone forever, but the copy writer tells us that something of the same healthy relaxation from a hot day's work can be obtained in a tubful of warm water fresh from the clean depths of a modern automatic storage gas heater. "—Just as old-fashioned as waiting for hot water." What is? A hansom cab of 1900, the trailing fashions of 1905, the bicycle-built-for-two of the '90's, the horse-less carriage of 1898. Anything, just so long as it partakes of the halting progress that brought us to the present stage of dependable convenience. "Are You Still Cranking Your Hot Water System?" is a reminder that improvements in household utilities have kept pace with developments in other industries. Just as cranking was abolished by the automotive engineer, so was the hand operated water heater supplanted by the gas engineer. And just as old-fashioned automobiles were wasteful of gasoline, so are obsolete gas appliances wasteful of gas.

The horse-car was another symbol that marked a definite age. Everybody is aware of the improvements that have been made in transportation since that day. The advertiser states that the coal furnace should be regarded as a relic of the horse-car age. "Mother's Shawl Was Always Kept Handy in the Early 80's." To this can be added the picture of the patient soul following her familiar custom of "waiting for the Saturday night bath." Some of us are old enough to remember the old-time country doctor who didn't "set much store" by regular bathing. He would have been horrified at today's fetish of the daily bath, and we would have a difficult time in selling him a water heater. But he, too, makes excellent advertising copy.

The early bathers, incidentally, were heroes in their day. As late as 1845, bathing was forbidden by law in aristocratic Boston unless on medical advice. Perhaps even the term "bootleggers," comes from Benjamin Franklin's imported "boot bath"—so-called because it was in the shape of a huge iron or copper boot—which Franklin used guardedly in the attic, since bathing inside one's house in Philadelphia of the 1760's was forbidden by law. When Millard Fillmore ordered a bathtub installed in the White House in 1850, he was severely criticised and warned of the consequences to his health. Even George Washington's home at Mt. Vernon offered no bath tub to its guests. On the other hand, Emil Ludwig attributes some part of Napoleon's greatness to the fact that he spent many hours regularly in a hot bath. He learned in early life, we are told, that hot water was the only thing that would soothe and refresh his worn nerves.

Material of this kind supplies at least one important requirement of all good advertising—the quality of INTEREST. It will be helpful to see how a number of successful gas companies have handled this ingredient in their copy.

(*To be continued*)

Gas Company Engineers Tell Janitors About Gas Appliances And Show How To Regulate Range Burners

THREE engineers from the New Business department of the Kansas City Gas Company recently talked to more than 100 Kansas City janitors at the janitor's school. The janitor's school is something new that was started in Kansas City in October. The course consists of talks by various engineers, architects, heating experts, fuel engineers and social relations teachers.

The three engineers from the Kansas City Gas Company who were invited to talk to the janitors were Harold McGrath, Frank Pexton and Ray Houser, all heating engineers in the New Business department under M. B. Buckley, New Business manager.

Mr. McGrath told the janitors about water heaters. He talked on the construction of the water heaters, the temperature that the company recommends carrying in apartment houses and gave them first hand information on how to adjust the burners. Mr. Pexton talked principally on the combustion of gas and Mr. Houser talked on gas meters and gas ranges. Houser explained in detail how the janitors could read the gas meter and the complete operation of the meter. He also demonstrated to them how to adjust burners on ranges as well as how to adjust the oven heat regulator.

The talks made by the Kansas City Gas Company employees resulted in improved public relations. The janitors will now have first hand information on adjustment of appliances and the fact that a janitor can adjust a range burner is going to prove valuable to the company. If a burner on any range in the apartment gets out of adjustment it will no longer be necessary to call the gas company and no delay will be experienced in getting the burner adjusted by the janitor. This also should be a saving to the company on service calls.—*Gas Service*

Experience at Evansville Due to The Change From Manufactured Gas to Natural Gas

I. C. SHEPARD

Sales Manager, Southern Indiana Gas and Electric Company, Evansville, Ind.

THERE have been a number of articles written on the subject of changeover from manufactured to natural gas and one reporting the experience at Evansville, and if I give a report on the experience of changeover, in our city, it will, necessarily, be restating what was done by our Engineers, Distribution Department and Service Department.

New fields of natural gas were discovered in the southeastern counties of Indiana, and the development of the fields in Gibson. Pike and Dubois Counties during the years 1928 and 1929 indicated that there was a large natural gas reserve, probably sufficient to supply cities and towns in Southwestern Indiana for a number of years.

The calorific value of the gas ranges from 900 to 950 B. T. U.'s depending on the sands from which it is taken.

With this source of natural gas near Evansville, the officials of the company decided it advisable to contract for a supply. After a dependable supply of gas had been arranged for, our Engineering Department made plans for the changes in the Distribution System and adjustment of appliances in use.

The Distribution System in Evansville was of the standard low pressure type, consisting of cast iron bell and spigot pipe with lead and cement joints.

Gas was supplied to the system from the holders during hours of low consumption and was pumped into the system with a fan type blower at times of high rate of consumption.

There was also a high pressure system, which was installed for the purpose of supplying two industrial plants. This system consisted of a 4" steel line and was supplied by two compressors. The system was of sufficient capacity for present demands, but would be inadequate to distribute natural gas during heating season when high hourly demands occur. To be able to supply these heating demand peaks it was necessary to supply the system at a location close to where the demand occurs.

An intermediate pressure line was laid from the city gate, at which point the natural gas was purchased, around the city with a branch to the gas works, which supplied the holders. This line passes through the outer sections of the city and is in proximity of the larger industrial plants.

Regulator stations were located at points where the belt line crossed the low pressure feeder main. Also some of the industrial plants services were tied into the intermediate belt line relieving the distribution system of that load.

The supplying of artificial gas distribution system with natural gas has developed some real problems, especially where the system is old. The natural gas, being very dry, will pick up all the moisture in the mains and the hydrocarbon oils in the meter diaphragms which results in a large unaccounted for or leakage of gas. To eliminate this trouble as far as possible, a rehydration plant was installed at the meter station.

The rehydration plant consists of a reheater, by means of which the incoming gas is kept at a constant temperature by means of steam coils. All gas passing is then raised in temperature a predetermined amount by the admission of steam into the gas stream. This rise in temperature is automatically controlled by a thermostatic arrangement and is a measure of the amount of steam admitted. By checking the degree of saturation, the necessary temperature rise is determined and set. The steam is therefore admitted at a rate directly proportional to the rate of gas flow. The amount of steam required is small, amounting to less than 1 lb. per 1,000 cu. ft. of gas. Steam is generated with a gas-fired boiler.

Natural gas is practically odorless. Leaks may develop on the main system and on the customer's premises that will be unnoticed by the usual methods of locating leaks in a manufactured gas system. Therefore, it is important that an odorizing agent be admitted to the gas, and in Evansville this is done at the point of entry. This odorant is admitted through an ordinary lubricator valve, and is very effective in producing an odor in the gas as used. The cost of using the odorant is small. Calodorant No. 3, produced by the Standard Oil Company of California, is used and by its use we have detected main and service leaks.

Due to the use of our rehydration plant and odorant,

Read before Indiana Gas Ass'n Convention, French Lick, Ind., Oct. 4-5, 1932.

and also handling of meters, we have kept our unaccounted for gas to very low figures.

When natural gas is used on a system where manufactured gas has been in use, it tends to absorb the oils which have been condensed out of the manufactured gas and absorbed in the leather meter diaphragms. This will cause damage to the meter diaphragms. Saturation of the gas with water vapor does not in any way prevent this. The absorption of these oils from the diaphragms by the natural gas takes place over the first several months. Meters must then be rapidly changed, brought into the shop, and a non-volatile oil kneaded into the diaphragms. By the end of 1931, all meters had been changed and reoiled.

The percentage of accuracy of the meters during the period when this was going on was maintained. We are satisfied that the rapid handling of meters in this manner is to a large degree responsible for the low unaccounted for gas.

Methods Used in Changeover

The plan decided upon was somewhat different than has heretofore been the custom. Changeovers usually have been made by taking an inventory of every appliance in the town, procuring and filing for each appliance and for each customer the necessary materials and directions for the changeover and training an organization to make it very rapidly over the entire community, or dividing the distribution system of the city into districts isolated from each other so that one district at a time could be changed when manufactured gas was turned off and natural gas turned on.

It was decided to attempt this changeover by distributing a mixture of manufactured gas and natural gas during the period of changeover and then, after all appliance adjustments were made, to turn on 100 per cent natural gas. To determine the mixture that we could use, if any, we carried on a certain amount of experimental work. This experimental work consisted of setting up in a large room made available for the purpose a line of appliances which would be representative of the appliances we would find in use by our customers. Various makes of stoves, water heaters, and other appliances were set up and connected. They were adjusted for manufactured gas in a manner such as might be expected in actual service. A large pressure tank of natural gas was brought down from the field for experimental work. Various mixtures of manufactured and natural gas were turned on to these appliances to determine how much natural gas could be used in a mixture with manufactured gas and have the appliances give satisfactory service on the present adjustment.

When this was determined, the appliances were then adjusted for 100 per cent natural gas by the use of adaptors, new orifices, changes in air mixers, etc. After this adjustment was made, the mixture was again turned on to the appliances to determine whether or not the readjustment appliances would operate in a satisfactory manner. By experimental work of this nature it was decided that we could distribute a mixture of 60 per cent natural gas of approximately 900 B. T. U. calorific value and .7 specific gravity, and 40 per cent manufactured gas (which was water gas) of 540 B. T. U. calorific value and .6 specific gravity to our customers and have nearly all of their appliances work in a satisfactory manner before adjustment, and also after their adjustment to use 100 per cent natural gas.

Probably the most efficient operation is not obtained under these adjustments, but since appliance burners, as they are found in homes, are rarely in exact adjustment, it was thought that the operation would be fairly satisfactory to our customers. As for the top burners on the gas ranges, the average customer will insist on turning on all the gas possible in order to speed up the cooking and in a majority of the cases where our service men were called back for readjustments, it was found that the customers wanted the burners over-adjusted instead of adjusted properly.

Organization for Changeover

Having decided upon the method and the mixture, and having collected all of the material and tools necessary to make adjustments to all of the appliances, and having decided upon the date on which the change would be made, an organization was perfected to make it. The city was divided into 56 sections, each section containing 350 to 400 customers. One conversion crew, consisting of a foreman and six men, was assigned a section which they were expected to complete in approximately one week. A map of the city was cut up into 56 pieces, each piece being mounted on a card. When the section shown on the card was completed, the card was turned in to the office and changed for a new one. The foremen of these conversion crews were selected from the various departments of the company. Not all were familiar with the burner adjustments, but all were dependable men, known to the company and capable of being trained quickly on adjustment work.

The men working under the foremen—about 60 in number—were new employees, and men of good character and appearance were employed. These conversion crews were to make all adjustments on ranges, hot plates, irons, tank water heaters, and room heaters. In addition to the conversion crews, a special crew was organized which consisted of 15 men selected from the shop, meter departments, etc., and these men were experienced in the adjustment of appliances. This special crew made all adjustments to instantaneous and automatic water heaters, gas refrigerators, house-heating furnaces and other special appliances. They also made adjustments to any appliance that the regular conversion men were unable to handle due to lack of experience, material or tools.

The special crew and the foremen of the conversion crews were carefully schooled in making appliance adjustments of all kinds. Meetings were held and practice adjustments were made on the line of appliances used in the experimental work on gas mixtures. Immediately before the conversion work was started all of the conversion men were schooled by their foremen to do their work. This instruction lasted only one or two days.

No preliminary survey was made of the domestic customers' appliances, but a preliminary survey was made of the industrial and commercial customers—846 in number. Special materials were procured for the conversion of this class of customer when needed and placed in an envelope, or in a special compartment, for use when required. Adjustments of the industrial and commercial customers' equipment were made immediately after turning on mixed gas by the special crew.

An instruction book and material for making the changes to burners were given to each foreman and conversion man.

Notice to Customers

All arrangements being complete, the day before the mixture was turned on, a red card was sent out to each customer advising him that adjustment was to be made

to his burners, and giving him instructions as to adjustments that he could make himself prior to the arrival of our conversion men, and advising the customer if he had any trouble, to call the office and a special man would be sent out. Notice of the conversion was also put in the local papers.

Mixed gas was turned on July 26, 1930, as per schedule, and the work of conversion started. The foremen were handed their map sections and went with their crews to the job. When a man entered any premises, he made a mark on the sidewalk or step in front of the house. When he completed his job he came out and made this chalk mark into a cross. The foreman circulated among his men, aiding them in their work. Whenever a customer's appliances were completed, a record card was filled out and turned over to the foreman, who turned it into the office, giving the following information:

Customer's name and location
Size, make and number of meter
Size of service
Make, size and type of appliance in use
Material necessary in making the adjustment, etc.

Whenever a conversion man met with an appliance that he could not adjust, he left a white "Do Not Use" tag on this appliance and shut it off, turning over a record of this tag to the foreman, who turned it in, and the adjustment was then made by the special crew.

Whenever any dangerous connections were found, such as flexible tubing, etc., a red tag was left on this, informing the customer of the danger. Whenever the conversion men could not get into the premises, a yellow tag was placed on the doorknob stating that our conversion man had been there but could not get in and asking the customer to telephone the gas service department immediately upon his return and not to use the appliances until our men had been there.

The results of the conversion were as follows:

Customers converted by the conversion crew	14,359
Jobs done by special crew at request of the customer	2,587
Industrial and commercial jobs and specially assigned jobs completed by the special crew	3,800
"C. G. I." tags (Can't Get In) were left at 1,257 vacant houses and at 991 houses where people were not at home. (These adjustments had to be made later.)	
Red tags on flexible tubing left	705

There were, of course, complaints of service during the changeover period. The customers were notified to call up the company if they had any difficulty before our conversion men reached them. A total of 2,587 calls were received from the 16,462 customers. It is our opinion that the greater part of these calls would not have been made if it had not been for the invitation of the company to the customers to make them. During the 10 days succeeding the completion of the changeover, all of the "C. G. I." customers were taken care of and 765 customers called up and asked for further adjustments to their appliances.

Effect on Send-Out or Gas Sales and Gross Revenue

Due to the methods employed of using mixed gas during the time that appliances were being adjusted a comparison for August would be of little value. If we take the gas sales for September, 1930, the first full month after natural gas was turned on and compare it with September, 1929, we find a decrease of 40% in sales and a decrease of 38% in Gross Revenue.

Sales for Sept., 1929	43,955,000	cu. ft.—Gross Rev.	$54,968.00
Sales for Sept., 1930	26,231,000	cu. ft.—Gross Rev.	34,347.00
Decrease in Sales	17,724,000	cu. ft.—Decrease in Revenue	$20,620.00

The Gas Rates were not changed when natural gas was turned on, believing that with a gas higher in B. T. U. or heating value that the demand would be greatly increased for industrial purposes, house heating, etc., and that the company would recuperate the losses in both sales and revenue in a short time.

While we have increased the sales for industrial and house heating by the use of natural gas, the total gross revenue of our Gas Department is still about 25% less than when manufactured gas was served.

Some rate reductions were made for industrial and house heating in the early part of 1931, but the effect of these reductions would be hard to determine on account of abnormal business conditions.

Control of Crater Wells

THE direct repair of crater wells is an almost impossible undertaking. The drilling of offset relief wells has been successful in "killing" some crater wells, but the drilling of these wells is extremely hazardous. Therefore the application of measures to prevent these "blow outs" is of prime importance, according to H. B. Hill in a recent United States Bureau of Mines report dealing with the crater-well problem in the Richland gas field of Louisiana.

During the development of this field, three crater wells of major importance have occurred in the main producing horizon at about 2,500 feet despite precautions that were taken to control the wells, and to prevent blow-outs. Some wells in the field had an open-flow gage of 65 million cubic feet of gas per day and initial closed-in pressures of about 1,125 pounds per square inch.

Gas leaks were discovered in several wells and blow-outs were prevented only by the quick action from experienced men in killing the wells with mud fluid. Two of the crater wells have been repaired but the other was still active in May, 1932. In the three crater areas, the upper sand became charged with gas from the deeper horizons and four additional blow-outs in craters have been formed at shallow depths, ranging from 300 to 600 feet.

The report has many illustrations which reveal the seriousness of the crater problem and indicate the almost impossible hope of applying direct remedial measures to the individual crater wells. The repair work on the two control wells in the Richland gas field has cost the operators very large sums of money. The physical surface damage is appreciable and the estimated losses of gas at the surface and in the subsurface formations can only be conjectured. The magnitude of the crater problem and its effect on the life of the field, ultimate recovery, and investment returns, requires cooperative action and agreement between operating companies, land owners, royalty owners, and other interested parties in applying remedial measures.

Copies of Bureau of Mines Technical Paper 535, "Crater wells, Richland gas field, Louisiana," which gives the history of these wells and discusses the equipment and methods used to control them, may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., price 10 cents each.

AMERICAN GAS MERCHANDISING ALMANACK

Do the obvious things this year—supply your customers with the things they want. Naturally it's up to you to make your advertising cause them to want them, your merchandise and displays appeal to their purse, the values you offer conform to their appreciation of a dollar's worth for dollar expenditure,—but you know the appeal, so we're off for a good old fashioned year full of a lot of hard work and Happy Results.

This is the time for gas men to shed their inhibitions and step forth on a new plane. Methods of measurement should be revamped, rates changed, modern selling mehods introduced and the war carried into the camp of the opposition, increased business and additional profits surely will not come through a hold-tight and a do-nothing policy.—*Thomas F. Kennedy before 1932 meeting, Penna. Gas Assn.*

January
1933

1—Sun. "Here's to your good health, your family's good health and may you all live long and prosper."—Rip Van Winkle.

2—Mon. All set; having discarded all the hooey accumulated during the days of high-pressure. **Let's go after load building.**

3.—Tues. Americans victorious in battle of Princeton, 1777.

4—Wed. **Get out from under your stuff. Remember the 1933 customer is a buyer of Value.**

5—Thur. Richmond, Virginia, burned by the British, 1781.
George W. Beck, Supt. Sunbury, Pa., stated: "I sold the first gas range of the year yesterday, with the thermometer 25° below zero. Last month we connected a linotype printing machine, a big coffee roaster and two instantaneous water heaters. We are figuring also on putting in gas to run a chicken incubator," 1904.

6—Fri. **Have a message of "What it will do for you" when you approach a prospective purchaser with an appeal to buy.**

7—Sat. Millard Fillmore, President, born, 1800.

8—Sun. A good day to take a mental inventory. **Advertise a Special for Lucky Friday the 13th.**

9—Mon. **Make a final check on your first quarter's advertising appropriation. Start to plan your advertising.**

10—Tues. Ethan Allen, of Ticonderoga fame, born, 1737. **Install your "Lucky Friday" store and window displays.**

11—Wed. **Time to haul out your plan for your February activity and make final revisions and order merchandise.**

12—Thur. Jack London, author, born, 1876.

13—Fri. A "Lucky Friday" one day special sale. **(Note: This is the only Friday the 13th of the year).**

14—Sat. Benedict Arnold born, 1741.

15—Sun. First practical locomotive put into operation, 1831.

16—Mon. **Check over final results of one day sale; there may have been "bugs" in the plan that you will wish to take out before you stage another one day sale.**

17—Tues. David Lloyd-George, British statesman, born, 1863.

18—Wed. **Have a heart-to-heart talk with your men regarding your general plans to build load during the year.**

19—Thur. General Robert E. Lee, born, 1807; celebrated by Southern states.

20—Fri. **A re-check of the month's activity should be made. Remember you have to watch things pretty close this year.**

21—Sat. **Have a talk with such men as may seem discouraged. You must support your men and they you; if you can't co-operate cut loose the line that drags.**

22—Sun. **Run a teaser advertisement on your February activity in the daily newspaper.**

23—Mon. George McManus, who makes 'em laugh, born 1881. We remember when he drew pretty poster girls for the St. Louis Republic.

24—Tues. **Check over materials needed for use in connection with your February activity. Go over details for store and window display advertising.**

25—Wed. Walter G. Africa, Manager and Superintendent of the Peoples Gas Light Company, Manchester, N. H., was elected President of the Manchester Board of Trade, 1898.

26—Thur. **Assemble merchandise for February activity. Make up price and display cards.**

27—Fri. Wilhelm II, former Kaiser of Germany, born, 1859.

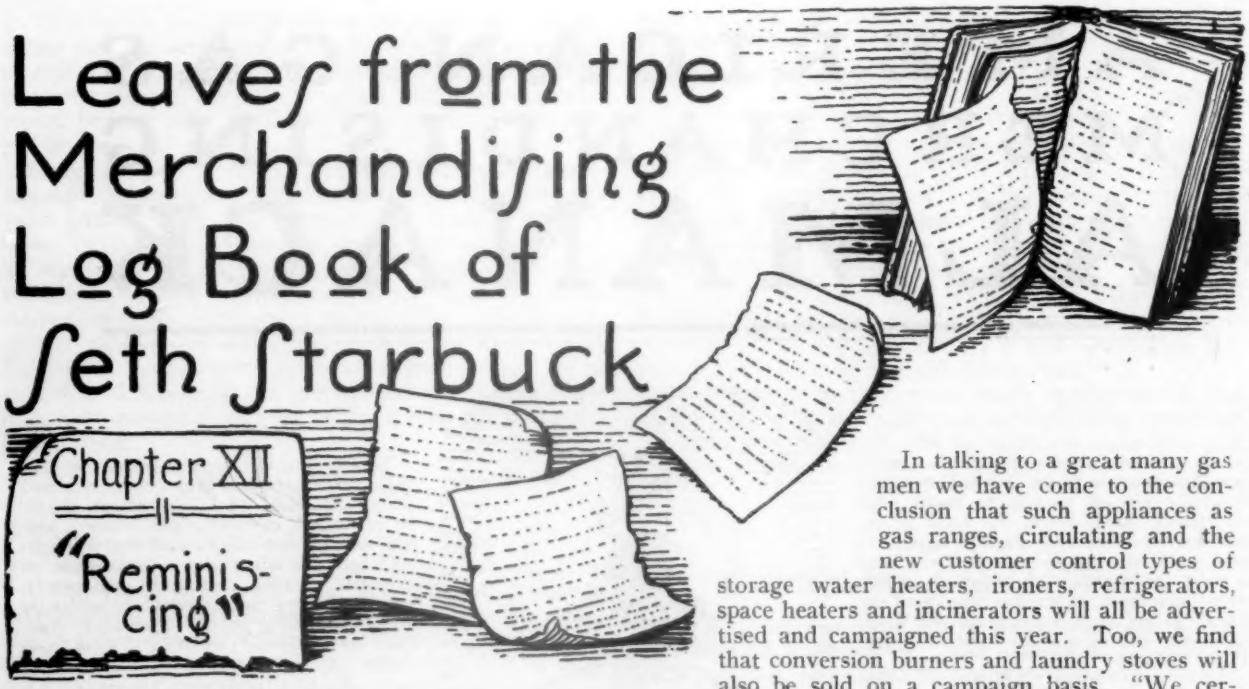
28—Sat. **Talk to sales people about your plans for February activity and the parts they are to play.**

29—Sun. A day for rest and recreation.

30—Mon. **Build your window display advertising for February. Rearrange and redecorate sales floor.**

31—Tues. **All hands on deck—the February activity starts tomorrow. Give out final instructions, etc, etc.**

Leaves from the Merchandising Log Book of Seth Starbuck



AS we face the new calendar we are apt to find many gas men reminiscing on what the recent lean years have brought to them in the way of lessons, and so, as we open our log book and face the "new deal," we do so with the realization that, rightly understood, the hard knocks we have experienced and the changes must be beneficial.

The old year was a very trying one, yet it brought its benefits.

It provided the gas man with more time and leisure in which to observe the trends of the times and the manner in which others in the merchandising field met and undertook to solve their problems. He saw department stores and specialty organizations swing into selling home appliances; he saw great organizations turning to direct mail advertising and checking and rechecking their mailings and the results attained from them. He saw human interest written into newspaper advertisements, copy that was not adorned by the appliance advertised. In short, he saw the trial and error method given an awful workout.

He learned that merchandise that was of questionable value was not a bargain at any price; that women who purchase home appliances first look for "worth" and that new fangled and so-called fashionable wares are the bunk. He found that women resented high-pressure selling; in fact he learned that most of them regarded such methods as smacking of "slickness." He saw that they were suspicious of premiums and frowned on free trials and that they were averse to purchasing non-advertised wares.

GAS men have been observing, and 1933 will find many changes in plans to procure customer acceptance for our wares—or we miss our guess. Our observation indicates that the gas man will face 1933 with a new planned advertising campaign and that he will tie in his personal sales effort and his direct and newspaper advertising at the point of sale. He will build not only timely and attractive window display advertisements but he will carry such advertising right up to the cashier's cage. He will train his sales people to cash in on these expenditures by actually leading people to examine the wares he has to offer.

In talking to a great many gas men we have come to the conclusion that such appliances as gas ranges, circulating and the new customer control types of storage water heaters, ironers, refrigerators, space heaters and incinerators will all be advertised and campaigned this year. Too, we find that conversion burners and laundry stoves will also be sold on a campaign basis. "We certainly have been overlooking the fact that folks want certain-home appliances," said the sales manager of one of the big operating companies. "We used to sell four hundred circulating gas water heaters in a single month, then for some reason we changed our policy and last year we did not sell four hundred during the entire year. The chain department stores and the mail order stores, on the other hand, sold thousands of them. How they were installed you may guess. We want to see these heaters properly installed and properly vented and 1933 will find us co-operating with every reliable plumber in this city. We need the load and if folks want tank heaters we will have a good one for them at a reasonable price and we will install it in the prescribed and safe way."

ANOTHER man we talked to said: "We have taken single oven ranges off our sales floor; in fact we have not sold them for several years only via catalog, but a recent survey indicates that the mail order houses have been selling them in good quantities in our town. Folks have doubled-up and many have been reduced in circumstances. They want small gas ranges and we are going to sell them to them and be assured that they get a satisfactory article.

Another thing we are displaying is laundry stoves and hot plates and we are putting them right up in front and making our displays just as carefully as though they were built for one of the modern ranges we offer for sale. We are going to give folks what they want and keep them cooking with gas. If we do not supply these items they will get them elsewhere and may even buy a cheap electric disc stove from the cut-rate drug store chain." And so the stories go.

As we thumb through the Log Book we find that the Inventory Sale seems to hold the stage, for after all this is inventory time with most folks and we would say that as we inventory our stock in making ready for the January sale, we should also give a little thought to a physical inventory of our store and display windows, especially if one of our New Year resolutions was to support our advertising and outside salesmen at the point of sale.

Windows should be given the once-over. New val-

ances may be in order. Perhaps a lighting man could suggest improvements in the lighting system that would cost but little yet vastly improve your window display advertising. The floors of your windows may need a coat of wax or varnish or, if too badly marred, a new covering. In your store there may be slight improvement that can be made that will speed up interest in your wares—small "islands" or raised platforms for the large appliances, modern racks for such small items as you stock. They may be built and painted in your own shop at a very slight cost. Then there is an entire re-arrangement of your store, a check up to ascertain whether or not the appliances you wish to feature are in the main travel lanes. These little things and many more should be inventoried now, at the out-set of the New Year.

THE Inventory Sale was originally instituted to move slow moving and excess stocks and odds and ends. We can see no difference this year, save that we feel that our advertising should be more descriptive, that it should be of the type known to the advertising fraternity as "reason why" copy and that in this it should stress values along with the inventory price. Folks throughout 1933 will be seeking VALUES and while newness of design will play a big part in the coming months, it will be design that promotes economy through increased efficiency and control.

One man that we talked to on the subject of a January activity said that he was planning to christen his sale "A Red Tag Sale" and that all items that carried a special mark down or were considered unusual values would carry a large red tag giving original price, number of units in stock and special January price with terms. His plan is to have large cut-out red tags for store cards and for use in connection with his window display advertising. His newspaper advertising while featuring the red tag idea will be so written and laid out as to feature value while giving a special red tag price for January.

January sales are as a rule staged to get the feel of the public pulse and at the same time reduce stores pending the arrival of new items, and as we view it, it makes little difference what name is given the activity; its success depends entirely on how you stage your show and how you carry on during the performance.

Summary of Gas Company Statistics for September 1932

REVENUES of manufactured and natural gas utilities totalled $44,048,759 in September, a decline of 6 per cent from the figure of $46,947,307 reported for September, 1931, according to data received from companies representing more than 90 per cent of the public utility distribution of manufactured and natural gas.

As of September 30, the customers of the reporting companies aggregated 13,875,511, as compared with 14,271,954 on the corresponding date of the preceding year, indicating a loss of nearly 400,000 customers during the twelve month period.

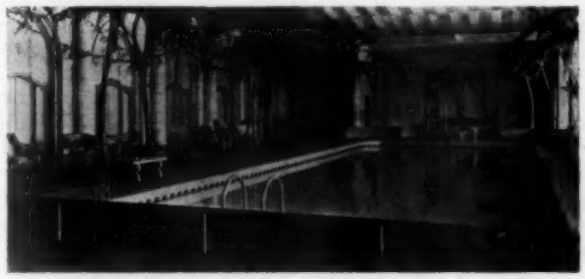
Revenues of the manufactured gas companies aggregated $29,123,431 for the month, a drop of 5.2 per cent from a year ago. The natural gas utilities reported revenues of $14,925,328, which were about 8.1 per cent under the figures for September, 1931.

Sales of manufactured gas reported for September totalled 26,193,700,000 cubic feet, a decline of 5 per cent, while natural gas utility sales for the month were 41,060,241,000 cubic feet, a decline of 11.2 per cent.

This decline in sales volume appeared to characterize practically all sections of the country, although not to the same extent. In New England September sales were 5 per cent under a year ago, while in the Middle Atlantic states the decline amounted to 3.5 per cent. The most marked curtailment in manufactured gas sales occurred in the East North Central states, comprising Illinois, Indiana, Michigan, Ohio and Wisconsin. Total sales for September were down more than 6 per cent from a year ago, the result in large part of a drop of some 18 per cent in sales to industrial-commercial users. —*Paul Ryan, A.G.A. Statistician.*

Use of Natural Gas at Noted Hotel

NATURAL gas has taken over several important tasks at the Fairmont Hotel, world famous hostelry on Nob Hill in San Francisco. It has been substituted for other fuel under the hotel's boilers to heat the great structure to supply steam and hot water to the kitchens and laundry, and to warm the water for the terrace plunge.



The Water in this Pool is Gas Heated

By the change the Fairmont maintains its reputation for modernity, comfort and service. And the Terrace Plunge adds heat by natural gas to other features which have made it popular with guests of the hotel and the general public.

The plunge, located on the Powell Street terrace, is finished in orange and green tile, and is 75 feet long, 25 feet wide and from two feet nine inches to ten feet deep. It is equipped with regulation diving equipment, and has the added feature of being surrounded by a gaily decorated, veranda-like area where swimmers or onlookers may enjoy refreshments; but most important, in the opinion of the plunge manager Philip Patterson and hotel officers, a constant supply of pure warm water. The water is thoroughly sterilized by a chlorine compound that gives off no odor whatever and does not cause the slightest burning or irritation. The supply is completely changed every seven hours, and the bottom and sides of the pool are vacuum cleaned. Natural gas keeps the temperature of the water at 80 degrees.

Like other hotels, the Fairmont has discovered that natural gas has many advantages over other fuels. It keeps the entire place warm and comfortable with less work and worry. It is cleaner and aids general cleanliness. It banishes the problem of storing and handling fuel. It insures longer life to the boilers. And it is cheaper—20 per cent cheaper, according to a check by Chief Engineer, B. F. Cramer.

Revolutionary Small House of the Future

HOUSES of steel and copper and even of aluminum as well as of wood and masonry, built at the factory with rooms such as the kitchen and bath completely equipped and the rest ready to be assembled at the site, insulated against heat and cold and noise, costing perhaps only half as much as the present small house, and placed in cities free from smoke, are described as merely awaiting the application of knowledge already largely in hand, in the eleventh and concluding volume of the final reports of the President's Conference on Home Building and Home Ownership, published December 1st.

This statement comes from a committee of nationally known scientists and engineers led by the late Dr. George K. Burgess, Director of the Bureau of Standards. It is supported by a careful analysis of practices and materials at present employed in small-house building which leaves no room for doubt of their relative wastefulness and inefficiency. For example, the Committee shows that the adoption of the practice of welding pipe would permit the use of thinner sheet steel and eliminate the laborious hand threading at the site which now raises the cost of plumbing. This practice plus the possible reduction of numbers of pipes, fittings, and fixtures by simplification and standardization, would in the opinion of one contractor who has installed a great deal of welded piping "reduce the cost of heating and plumbing installations by one-half."

The Committee's analysis takes no aspect of the present small house for granted, and concedes no authority to tradition. Beginning with the foundation and cellar and going through the walls and floors and finishes to the roof every feature of the house as we now know it is made to answer as to whether present materials and practices are less efficient than others that might be used. As a result, a good many things which we now take for granted are found wanting. The universal practice of fabrication at the site and the use of the sloping roof are alike condemned as costly and unnecessary and practical substitutes recommended. It is definitely shown that some of our present heating practices are wasteful and that it is possible to reduce the cost of heating to the home-owner and eliminate the dirt and the smoke nuisance. Again it is shown that our methods of garbage disposal are crude and expensive beyond reason.

In short, the Committee has painted a realizable physical idea for the small house of the future. It has shown how much of this ideal could be immediately translated into reality and what is still to be worked out. The Committee's report will inevitably serve as an inspiration and a guide to engineers, to architects, to builders, and to dealers in materials in the development of the house of the future.

This final volume of the President's Conference reports, entitled "Housing Objectives and Programs," completes the program, formulated by the Conference at its meeting in Washington last December, to raise the standard of American housing. The volume contains the reports of the six correlating committees, whose business was to digest the material assembled by the twenty-five fact-finding committees and to indicate how their findings could be translated into action.

The report of the Committee on Standards and Objectives, which was under the chairmanship of Lawrence Veiller, Director, National Housing Association, gives a picture of the quality of housing Americans ought to enjoy. The statement of these standards reveals how far short of the possible our present housing falls. It also reveals the complex nature of housing—its dependence upon the neighborhood, the public utilities, the financing system, and the government of the community. As Robert P. Lamont, former Secretary of Commerce, says in a foreword, the statement of objectives "once for all proves the impossibility of producing acceptable housing by isolated individual effort."

The eleven volumes of the Conference reports can be purchased for $10.50 a set, postpaid, or for $1.15 each, postpaid, from Dr. James Ford, President's Conference on Home Building and Home Ownership, Department of Commerce Building, Washington, D. C.

Selling Gas Refrigeration

FROM the paper, "Developing Retail Refrigeration Sales," by Cyrus Barnes, there is given below that portion dealing with the sale of gas refrigeration by combination companies.

"Why should a gas and electric company, which is doing a good job selling electric refrigerators, alter its policy and put its major effort behind the sale of gas refrigerators? That is a natural and inevitable question—a question which we had to face in the Tenney companies.

"Now, let me say that we have sold both electric and gas refrigerators since they were put on the market. Heretofore we have not pushed the sale of the gas refrigerator in districts served by our combination companies because—heretofore—the price of the gas refrigerator has been higher than the electric. But we have, for many years, studied the performance of the two types. And we know that in certainty of performance, in its silent operation, no machinery, low operating cost and long life, the gas refrigerator is—to put it mildly— unsurpassed in its field. In other words, we knew from our own experience that we could honesty offer the gas refrigerator to our customers as an appliance which would serve them at least as well as the electric. The question, therefore, resolved itself into a matter of company policy. The gravest problem facing the combination companies today is the maintenance of the gas load. If the sales department by establishing an equilibrium in its efforts can aid the company to solve its greatest difficulty, certainly it is the duty of the sales department to do so. Even at the expense of a little more effort and bother to itself. Those of us who direct the sales departments of gas and electric companies know quite well that there are scores of electric appliances which can be sold to maintain and increase the electric load. We also know that there are not many appliances which can be sold to increase and maintain the gas load.

"The gas refrigerator is the only appliance which offers itself as a means of readily increasing the gas load and—this is even more important—of establishing in the minds of the customer a new conception of gas, a picture of gas as a truly modern service, a state of mind that makes the customer receptive to other automatic gas appliances and thus retains to the company the gas load. The gas refrigerator serves the customer every whit as well as the electric refrigerator; the sale of gas refrigerators is the one procedure notably effective at the present time to hold and safeguard the gas load. There can be, it seems to us, no doubt as to the duty of the sales departments in combination companies; they

should put their major effort in refrigeration behind the gas refrigerator.

"We, therefore, decided that this year we would stress gas refrigeration in all territories served by our gas companies—both straight gas companies and combination companies. Our first step was to establish prices comparable with those of the electric refrigerator. That is, we offered our customers an opportunity to purchase a gas refrigerator at a price within the range of prices of electric refrigerators of similar cubic foot capacity. This meeting of the competitive price is much more important than it was a few years ago. When electric refrigerators were still rather uncertain in performance and required more servicing than they do today, the difference in price levels between the gas and electric refrigerator had frequently less influence on the purchaser than an assurance of service. Today electric refrigeration is perfected; the standard makes are serviceable, satisfactory, effective machines. To sell gas refrigerators today the price of the gas refrigerator must be fairly comparable with that of the electric competitor. We realized that fact. We established such prices.

"We anticipated difficulties in arousing our sales force to enthusiasm for the gas refrigerator. We were not mistaken. We found difficulty. There is in the gas industry little enthusiasm for the gas refrigerator; in the sales force of a combination company, among men who have been selling electric refrigerators, there is none at all. Fortunately, as I have said, we anticipated none. But we developed it. We developed it by making the salesmen and the service men *live* with gas refrigeration until they really understood it. Our training schools were schools, not gathering places for poker and golf interspersed with an occasional informatory talk and a lot of "pep" speeches. For a sufficient time our men really studied gas refrigeration and were given examinations at the end of the course to determine their qualifications. During this time they lived with the gas refrigerator, taking it apart, putting it together, coming to understand it, to comprehend its principle in all its simplicity and effectiveness, living with gas refrigeration until its noiselessness and its certainty and its relative freedom from trouble and the significance of its lack of moving parts grew into their consciousness and founded there a real understanding and a true enthusiasm for this unsurpassed method of automatic refrigeration.

"So we sent them out, brimming with enthusiasm. We paved the way for them with good sound advertising offering this unsurpassed form of automatic refrigeration at prices comparable with the electric machines. We backed up every sale with inspection and later re-inspections by the service men so that no dissatisfaction might arise from a poor adjustment. We made sales; we made more sales than we had hoped to make. In the first seven months of this year, the sale of gas refrigerators in all our companies rose from 8% of the total refrigeration sales to 24%; in our combination gas and electric companies the ratio of gas to electric refrigeration sales rose from one in fifty to one in eight. Considering all the conditions—including the general economic state of the country—we are not at all dissatisfied with the results. In the total number of gas refrigerators sold, in the dropping disparity between percentage of each type, and especally in the unprompted missionary work which the contagious enthusiasm of purchasers is performing, we feel that our efforts have been well repaid.

"I wish I could report that our salesmen retained their enthusiasm undiminished. They did not. Their firm conviction that the gas refrigerator is unsurpassed in its field remains unaltered; but their hope of speedily transmitting that conviction to the minds of prospects has frequently flagged. They dash up against that unhappily widespread notion that gas is an old-fashioned service, unfit to operate automatic appliances; they are swamped by the promotion effort in behalf of electric refrigeration, mighty in its national magnitude and cohesiveness, overwhelming in its impetus which the years behind it give to it. They come back to us, our salesmen, frequently disheartened. We stiffen their backbones; we renew their courage; we send them out again. We understand. They feel so terribly *alone* in this struggle against competition organized on a national scale. Their industry as an industry, as a nationally organized force, is doing nothing for them. Any single company, any single group of companies, which proceeds to promote the sale of gas refrigeration, is fighting a lone-hand fight in this sales struggle, single-handed against a nationally organized competition."

Gas Refrigerator Attains High Rank in Newspaper Advertising

FOR the twelve months period ending October 1st, 1932, Electrolux Refrigerator was awarded second place for outstanding newspaper advertising in competition with hundreds of products and commodities which find daily use by the American people.

Electrolux obtained an official point score of 19, being surpassed only by Borden's Products which took first place with a score of 23. The nearest score of any other automatic refrigerator was 8 points, this appliance being tied with nine other products for the forty-third place.

These selections are made for National Ad-Views

and are passed upon by a committee of six advertising executives before they are accepted. These newspaper advertisements are selected on the basis of: first, making the consumer know the product and stamping its name on his mind; second, containing a sound promotion idea rather than mere wordery; third, being outstanding for artwork, layout and copy.

A specimen of the newspaper ads which assisted Electrolux in compiling its relatively high score is shown on the preceding page.

EQUIPMENT NEWS

The Emcoloader, a New Product Announced By Pittsburgh Equitable Meter Company

The Emcoloader, the trade name given to a new product announced by the Pittsburgh Equitable Meter Company, is designed for the purpose of applying automatic pressure control to low pressure gas distribution systems. Extensive changes in the system are not necessary since the Emcoloader is used in connection with any standard low pressure regulator.

A micrometer adjustment which enables the operator to control the boost, and a small pressure limiting regulator which prevents the boost from going above a predetermined maximum, are incorporated. The Emcoloader can also be used as a meter to determine the rate of flow through the regulating station at all times.

The Emcoloader is made in sizes from 3 inches to 20 inches. The Pittsburgh Equitable Meter Company has published a catalog fully describing the operation of this new product and will send a copy to those desiring more information.

Emcoloader

The company also announces a new Emcorector, the Type I. This new type will be manufactured in addition to the present Type T and Type W Emcorectors.

The Type I Emcorector differs from the other types in that it is not equipped with a chart for recording metering pressure and volume. In place of the chart there is provided an indicating pressure scale, visible through a glass in the case, by which the static pressure under which the meter is operating can be determined at all times. It gives a direct reading of volume computed to any base pressure, regardless of line pressure fluctuations. Thus the installation of an Emcorector makes the meter a direct reading meter and eliminates the time and expense elements involved in making chart calculations.

Emcorector

New American Car & Foundry Co. Gas Service Valve

A new gas service valve has just been brought out by the Valve Division of American Car and Foundry Company, 30 Church Street, New York. This valve, commonly called a curb cock, is arranged with Dresser couplings.

The head construction follows the well-known a.c.f. Milliken valve. A shoulder is provided on the plug which seats itself against the shoulder on the body at the top of the valve, making a metal to metal seat and obviating the necessity for packing or gaskets. The construction is such that the higher the line pressure, the tighter the head becomes.

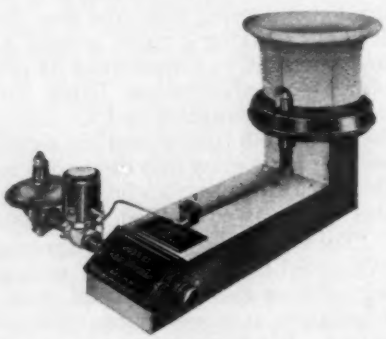
For all practical purposes the port opening in this valve is round, being slightly closed on the vertical sides but giving 95% full pipe area opening. The bottom and the top of the port opening are circular and follow the inside lines of the pipe. There are no pockets in the bottom of the plug where sediment can collect, and perfect drainage in the line is provided.

There is a stop on the stem of the plug and on the body so that the plug can only be operated through 90 deg., i. e., from a fully closed to a fully open position. This feature informs the operator when the valve has been properly turned to either shut off or turn on the gas.

The lugs on the side of the body which take the tie rods used in the coupling connection are arranged so that a man, when running a pipe line, can apply the valve to the end of the line, place the valve in a closed position and turn on the gas up to the point where the valve occurs. Later on, they can carry on the construction work, making the pipe connection at the other end of the valve, and then by turning on the valve, introduce the gas into the new portion of the line. The valve is designed for 100 pounds gas working pressure.

New Type Radiant Features Latest Roberts Model

Roberts-Gordon Engineers have made another important contribution to the gas industry—a new principle of burner radiant design. These radiants have been tested in the field on Roberts Standard Burners for a period of over two years and exhaustive tests show a high and successful standard of performance.



Roberts Standard Burner

The new Roberts Radiants are self-supporting and no part of them comes in contact with the walls of the fire pot—consequently there is no chance for misalignment or shifting of radiants—as the new radiants always remain in a fixed position.

The Roberts Standard Burner will now fit a greater range in size of boilers and furnaces and the varying angles of fire pots do not have to be considered. The new radiant functions perfectly in a fire pot of any angle and insures better combustion under nearly all circumstances.

Important too, is the ease with which these radiants may be installed and the consequent saving of time to installation crews. Adjustment of burners is now made without the removal of radiants.

The New Milburn Paint Spray Gun

A Paint Spray Gun with new exclusive features which have proved under severe tests and working conditions superior in many particulars, has been placed upon the market by The Alexander Milburn Co., Baltimore, Md. This spray gun is made in two sizes—Type M for large industrial and automotive work, and Type N for fine touch-up and high lighting.

Milburn Paint Spray Gun.

The body of the gun is made of an improved aluminum alloy, having a tensile strength of over 60,000 pounds per square inch. The passages for air or fluid are all straight drillings; plugging or by-passing which is found in many spray guns is eliminated. The handle is part of the forged body of the gun, and through its simplicity of design, reduces the usual weight about eight ounces. The Type M weighs approximately 1¼ pounds and the Type N, ½ pound. The body of the gun forms a triangular frame which houses and protects the working parts from injury and the frame from distortion.

The fluid nozzle and air atomizer head are constructed on new principles. The air atomizer head has a seat in its base, into which the hardened steel nozzle seats both vertically and horizontally, giving rigidity and close alignment to the parts—an essential feature in a spray gun.

The atomizer head is formed in one piece and drilled so that the planes through which the air passages traverse are true parallel surfaces with the air orfices at right angles. The holes go straight through and have no cross drillings thus permitting easy and instant cleaning. The external holes of the atomizer head are of special countersunk construction protecting the air currents from deflection and surfaces of the holes from injury.

The fluid, such as paint or lacquer, is controlled as to volume or density by means of an independent, removable unit needle valve made of stainless steel, adjacent to the operator's hand. Through the air valve control and the paint valve control, any width or shape spray or volume of material can be obtained. A special latch releases the paint control so that the spray can be cut off for safety while the operator is climbing ladders or scaffolds. It also allows the full air supply to be used for dusting.

The gun has large separate air passages for the central atomizing and flattening of air, all controlled by a single knob, the mere turn of which controls the initial air pressure and the air for both round or flat sprays. The paint volume is controlled from a fine mist up to the widest capacity of the spray. The spray gun is original in that it has means for controlling initial air pressure from its source without the necessity of an air regulator and equalizes erratic variations in the air compressor.

New Connersville Meter Bulletin

Roots - Connersville - Wilbraham, Connersville, Ind., have recently issued Bulletin 40-B10 devoted to Connersville Meters of the 2-impeller rotary displacement type, which are known by the gas industry as the "positive displacement" type.

Connersville Meters are commercially accurate over a wide range from approximately 10% to 150% of normal ratings. On this basis, the 3½ x 10 low-pressure meter, with a normal rating of 9000 CFH, has an effective range of from 900 CFH to 13,500 CFH. A table of ratings in the bulletin lists capacities of the various sizes.

Rotary Displacement Meter.

Low-pressure types can be supplied in standard sizes for capacities up to 800,000 CFH at line pressures up to 15 lbs. Special arrangements of smaller meters are available for 25 lbs.

High-pressure types are built for maximum peak line pressures up to 75 lbs., with capacities up to 467,000 CFH.

Extra high pressure meters, in a special steel case arrangement, can be supplied for pressures of 300 lbs. and greater.

Connersville Meters may be fitted with a variety of recording instruments, such as the Pressure-Volume-Temperature-Time Recorder, which makes a chart record of 24-hour operation, the Demand Recorder, with 35-day strip chart, the pressure-Volume Recorder, and other instruments such as pressure integrators, etc. Regular equipment includes a direct-reading register and a differential gauge.

At normal ratings the differential pressure does not exceed 1-inch water column, and may be as low as 1/10 inch at low rates.

Part of the laboratory equipment at the Connersville Blower Company plant includes a 2800 cubic foot dry-type prover on which meters are calibrated for accuracy of operation.

Connersville Meters are used in both the manufactured and natural gas fields, as well as being utilized by oil refineries, chemical manufacturers, and other process industries; also for measuring gas generated in digester tanks of sewage disposal plants.

Rudy Furnace Co. Enters Low Priced Field With a New Warm-Air Series

Rudy Furnace Company, Dowagiac, Mich., has announced a new warm air furnace, known as the "200" series, to sell in the low priced bracket. Designed as a coal-fired furnace, the new series may be adapted to gas-firing.

Charles J. Biek, general manager of the Company, states that the demand as a result of the new line will necessitate the stepping up of foundry and factory operations.

"While we have placed a price on the new furnace line comparable with that on lines marketed 17 years ago by us, we have in no way cheapened our product," Mr. Biek said, "The '200' series might be called a 'thrift' model in that the new series has been stripped of some features carried by the Standard Rudy series."

NEWS of the GAS INDUSTRY

Consolidated Gas Company Dedicates Tower

The 500-foot Tower of the Consolidated Gas Company building at 14th Street and Irving Place, was dedicated at noon on Armistice Day, November 11, to the memory of the employees and officers of the Company and its affiliated companies who served the United States and its Allies during the World War.

The climax of the ceremonies was reached with the unveiling of a special tablet, to be placed in the main corridor of the building at the base of the Tower. General James G. Harbord, Floyd L. Carlisle, chairmen of the Board of the Company, and Geo. B. Cortelyou, president, spoke briefly. City officials, architects, and representatives of public utility companies and of civic associations were in the audience.

The inscription on the Memorial Tablet reads as follows:

"The Memorial Tower above this Tablet commemorates the faith and fidelity of the employees and officers of the Consolidated Gas Company of New York and Affiliated Companies who served the United States of America and its Allies in the World War. Of the three thousand and fifty-two in the uniformed forces, these seventy-four made the supreme sacrifice. . . ." The names of those who died are then listed in alphabetical order.

General Harbord commended the motive of the Company in honoring its war heroes by dedicating to them its Tower of Light. Mr. Carlisle stated that it was significant that the Company, which is engaged in rendering services vital to the machine age, should pause for the more serious things of life as represented by the dedication.

Lawrence Gas Plant Equipped with Scrubber Standpipes

The Lawrence Gas and Electric Company, Lawrence, Mass., has recently installed the Congdon Scrubber Standpipe system. This new type of equipment improves the operation of coal gas manufacture considerably.

Plans and specifications for the installation of this equipment were made by the Engineering Department of the New England Power Engineering & Service Corporation. With the exception of a few special parts which were erected by the manufacturer's representative, the entire installation was made by the local forces of the Lawrence Gas Company.

The New England Power Engineering & Service Corporation handled the design, purchased the equipment and supervised the installation. The work was successfully completed ahead of schedule and well within the estimated cost.

Tampa Gas Company Announces New Rates

Effective January 1st, 1933, the following new rates for gas will be available in Tampa:

Domestic Gas Rate

			Gross	Discount	Net
Min.	400	Cu. Ft.	$1.11	.11	$1.00
Next	600	" "	1.90	.19	1.71
Next	4,000	" "	1.67	.17	1.50
Next	10,000	" "	1.11	.11	1.00
Over	15,000	" "	.89	.09	.80

Industrial Gas Rate

Block	Hourly Demand		Charges per Month
A	100	Cu. Ft.	$2.00
B	200	" "	3.00
C	300	" "	6.00
D	400	" "	8.00
E	500	" "	10.00
F	1000	" "	20.00
G	1500	" "	30.00

Gas Commodity Rate

First 10,000 Cu. Ft....90c per M Cu. Ft.
Next 190,000 Cu. Ft....60c per M Cu. Ft.
Over 200,000 Cu. Ft....50c per M Cu. Ft.

Based on a scientific rate structure which shows the exact cost of service to each class of gas users, these new rates offer savings to consumers whose use of gas monthly exceeds the level of fixed minimum consumption necessary to meet fixed costs of service. This minimum level is 1,000 cubic feet monthly.

The public as a whole will participate in the benefits of the new rates because Tampa's schools and other public buildings will be supplied with gas for heating and cooking at lower cost. Individual domestic users whose consumption exceeds the fixed minimum level also will benefit.

Ozark Distributing Company Lays New Line

H. L. Siebenthaler, manager of the Ozark Distributing Company, Monett, Mo., has issued a statement that his company has just completed laying a line to the Peirce City Lime Company at Peirce City, Mo. The new line is four inches in diameter and the lime company is expected to start using gas about January 1.

Convention Calendar

December

13-16 Pacific Gas & Electric Co., Home Appliance Exposition, San Francisco's Civic Auditorium, San Francisco, Calif.

14-15 Pacific Coast Gas Association, annual Organization Conference, Whitcomb Hotel, San Francisco, Calif.

January

23-25 39th Annual Meeting American Society of Heating and Ventilating Engineers, Hotel Gibson, Cincinnati, Ohio.

Approves Right of Gas Company to Build Holders for Storage in Business District

The New York Supreme Court for Richmond County has entered judgment in favor of the New York and Richmond Gas Company, in its certiorari proceeding to review and set aside a determination by the Board of Standards and Appeals of the City of New York, which denied the Company the right to build gas storage tanks and appurtenances upon a parcel of land which it had acquired for the purpose, in a business use district.

The parcel of land lies in an undeveloped part of the Borough of Richmond, and there are no structures of any sort within five hundred feet and no substantial improvements in the immediate vicinity. The court found that the case presented showed clearly a public need for the proposed structures and declined to be bound by the strict letter of the zoning resolution in the particular case.

(In the Matter of the Application of New York and Richmond Gas Company for a Certiorari Order against Connell, *et al.*, Supreme Court, Richmond County. October 28, 1932.)

Change Resident Agent

Officials of the Indiana-Kentucky Natural Gas Corporation of Indianapolis, have filed papers with the Indiana secretary of state changing the name of the resident agent to Romney L. Willson, State Life building, Indianapolis.

Big Natural Gas Boom in Indiana

Pike county, Indiana, is experiencing one of the greatest natural gas booms in its history and now is said to be producing more natural gas than any other county in Indiana. Noble & Robertson have drilled in a 1,000,000 foot well five miles east of Petersburg and the Bement Oil Company has drilled a well four and a half miles south of the city. Many other wells now are being sunk. The Missouri-Kansas Pipe Line Company has agents in Petersburg trying to arrange to buy 10,000,000 feet of gas daily and already has surveyed a six-inch pipe line from Patoka to Alford.

Novel Method of Getting Across An Idea

Seldom has the program of Utility Hall of Equitable Gas Company, Pittsburgh, Pa., included a feature as interesting or as unusual as the Puppet Show which ran for four performances last month. The title was "Dame Drudgery Dreams", the time, "a hundred years ago, more or less." The subject of the play was, to put it most prosaically, Dame Drudgery's glimpse into the perfect kitchen, 1932 model. In the first of the two scenes, the old-fashioned kitchen of Dame Drudgery is shown, where she has to carry water, fetch wood, make the fire, bake the bread, and carry on a hundred and one other household tasks. At the end of the day, she is far too tired to accompany her spouse, Master Fussyhub, to a party given by Ben Franklin to show some new-fangled idea he has evolved to benefit mankind. Instead she falls asleep and is then transported on the tail of Ben Franklin's kite to the home of the wizard where he has hundreds of things designed to benefit womankind. The second scene is the model kitchen where all these wonders are stored. Dame Drudgery, overwhelmed by the marvellous things she sees here, goes back to earth to spread these ideas abroad.

Every detail was painstakingly cared for. The stage was set for both scenes with as much precision as on many a stage set for real actors instead of dolls. The modern kitchen with its gas range, double drainboard sink, kitchen cabinet, and automatic refrigerator would arouse pangs of envy in the heart of any housewife. The puppets themselves were the work of artists, imaginative in design and very capably executed. The authors handled the subject excellently, bringing out the points Utility Hall wished emphasized by means of clever and unusual rhymes.

Miss Karen Fladoes, Home Service Director of the Company, had charge of the show.

Havre de Grace Gas Company Sold

The Havre de Grace Gas Company, Havre de Grace, Md., has been sold to the Consolidated Gas, Electric Light & Power Company of Baltimore. It was formerly owned by the National Public Utilities Corporation of Philadelphia, Pa. When it was purchased by this latter company in 1927, the Havre de Grace Gas Company had less than 450 meters. Since that time the gas sales have been nearly tripled. The number of gas consumers has been practically doubled and the average cost of gas to the people of Havre de Grace has been considerably reduced.

The Baltimore Gas, Electric Light & Power Company had been negotiating concerning the sale of the property for more than a year. A contract was finally signed in the early part of October between the two companies. The sale was made for cash and all the employees of the Havre de Grace outfit have been taken care of by the Consolidated Company.

Bill to Broaden Utilities' Regulation of Rates

A resolution has been introduced in the Atlanta city council which would petition the next Georgia General Assembly for the enactment of legislation giving all municipalities in the state of 200,000 population or over authority to regulate the rates and services of gas light companies, electric power companies and all other public utilities. The provision would give Atlanta "Home Rule" in the regulation of its utility corporations, removing them from the control of the state public service commission.

Chemical Exposition Set for 1933

The Fourteenth Exposition of Chemical Industries is scheduled for the week of December 4th, 1933, according to a recent announcement by Charles F. Roth, Manager. The selection of these dates will bring the exposition at a time co-incident with the annual meetings of the American Society of Mechanical Engineers and of the American Society of Refrigerating Engineers, the members of which, it is believed, will welcome the opportunity to attend the exposition. It is probable also that certain of the national chemical organizations may arrange New York meetings to occur during the same week.

Company Formed to Drill for Gas

Articles of incorporation have been filed with the Indiana secretary of state by the White Well Drilling Company, Inc., formed to drill for gas wells. The corporation has an initial capital stock of 100 shares having no declared par value and the first board of directors is composed of Kenneth White, Theodore Lockyear and John H. Jennings. The principal place of business will be at Princeton, Ind.

Coke Production Increases

Paralleling the recovery in the iron and steel industry, production of coke increased sharply in October, thereby continuing the gains made in September, which recorded the first improvement in many months. The combined average daily output of by-product and beehive coke for the month was 10.2 per cent greater than for September, which, in turn, was 8.3 per cent greater than for August.

The total output of by-product coke for October amounted to 1,738,716 tons, an increase of 194,225 tons over September. Most of the gain occurred at furnace plants. The average daily output of by-product coke increased 8.9 per cent in October, while that for beehive coke increased 47.9 per cent.

Another favorable development was a decrease of 195,000 tons in the stocks of by-product coke on hand at producers' works. Stocks of coke in retail dealers' yards also show a decrease. The tonnage held by 400 representative dealers on October 1 was 52 per cent less than on the same date last year.—*U. S. Bureau of Mines.*

State Capitol to Be Heated by Gas

The new $5,000,000 state capitol building at Baton Rouge, La., will be heated with gas. This building is 33 stories high and is the tallest building in the South.

The heating plant is equipped with four boilers; three of them 250 horsepower, low pressure, the other 50 horsepower, high pressure. All four are of the fire box type.

The main reason that gas was chosen to heat this beautiful new structure was to afford a maximum of cleanliness, convenience and efficiency.

New Gas Franchise Granted

The Liquefied Natural Gas Corporation, Minneapolis, Minn., was recently granted a twenty-year gas franchise in Tracy, Minn., and are going to install an undiluted propane system in this town.

They will use the bulk storage facilities at Tracy for the distribution of gas to the adjacent towns by tank truck. They have already received twenty-year gas franchises in the towns of Currier, Jeffers, Lamberton, Sanborn, Butterfield and Comfrey.

Files Petition for Receivership

A petition for the appointment of a receiver for the Northern Indiana Fuel and Light Company, operating at Kendallville, Avilla, Altoona, Garrett, Auburn and Auburn Junction, has been filed in circuit court at Kendallville by counsel for Carl O. Sondahl, a bondholder. The action is the result of a move to reorganize the Northern Indiana Fuel and Light Company, the Michigan Light and Fuel Company and the Wisconsin Light and Fuel Company in which it is alleged, bondholders of the Indiana company would suffer financial losses.

New 16-Page Magazine Issued by Gas Company

The North Central Gas Company, Scottsbluff, Nebr., has started a new 16-page magazine named "The Flame". This magazine covers the natural gas industry, and also gives reliable information on the proper types of burners for different homes and buildings.

This magazine is a monthly publication.

New All Gas Home Started

Work was recently started on the Masonite All Gas Home, Hodgenville, Ky. The Masonite Home was the result of a contest for architects for the design of a home most modern in appearance and using Masonite and Presdwood products. A Bryant air-conditioning unit will maintain pre-determined temperature by wafting clean heated air through the several rooms. Gas will heat the water, make ice cubes, cook the meals and burn the rubbish.

Increased Use of Gas in Industry

The use of manufactured gas in industry has increased approximately two thousand per cent throughout the United States within the last twenty years. Today the quantity of gas used for industrial and commercial purposes in New York City is equal to the amount required for such uses in the entire country in 1912.

Consumers Power Company Wins Display Honors

The Consumers Power Company, Jackson, Mich., has again been successful in the Annual Competition for Display Supremacy, which contest is held by the International Association of Display men. The Consumers Power Company was awarded the second and fourth prize ribbons for the best window display of gas or electrical appliances for July, 1931 to June, 1932.

The Display Department of the company is headed by Delbert S. Ford.

New 17 Mile Line Announced

The Columbia Gas & Electric Company, through its subsidiary, the Amere Gas Utilities Company, plan to lay a 6 inch line from Pipestem through Athens to Princeton, provided gas franchises are given the company for Athens and Princeton. It is estimated the cost will be $175,000. The gas rate will be a minimum of $1.00 per month for each customer, and from 75 cents to 65 cents per 1000 cubic feet.

Town Border Gas Station Being Rebuilt

Rebuilding and improvement of the Cities Service Gas Company town border station for Carthage, Mo., was started recently.

Two small buildings will be erected to replace the present original sheet metal structure which houses the gas measuring and pressure regulating equipment at the city gate. The improvement work is being done both to make a more attractive plant, eliminating the old weather-beaten structure, and to more conveniently arrange the equipment. A temporary service connection has been installed to be used while the improvement work is being carried on.

Reduction in Domestic Gas Service Rates Granted

City officials at North Manchester, Ind., and the Northern Indiana Power Company have negotiated an agreement on reduction in domestic gas service rates and the company has filed the new schedule with the Indiana public service commission.

Large Gas Well Brought In

The best gas well ever drilled in the Portland, Ind., territory has been brought in by N. E. Masters, Portland operator, four miles east of the city. The well was started last summer in wildcat territory. After drilling a few hundred feet, gas was struck and as the well was sunk the pressure increased. The tools finally were blown out, the gas caught fire and blazed for several days before the well could be capped. Tests have been made showing the well produces 1,500,000 feet a day. It is estimated this will produce enough gas to supply Portland for the next thirty years. Tests show it to be free from sulphur. Negotiations are under way with the Ohio-Indiana Public Service Company whereby gas from the well may be used at Portland, Union City and Winchester.

Lincoln Electric Appoints New District Manager

Appointment of Fred C. Archer as manager of the Philadelphia district is announced by The Lincoln Electric Company, Cleveland, Ohio.

Previous to his joining the Lincoln staff, Archer was president of The Fred C. Archer Company, which he organized in 1925. Before going into business for himself, he was employed by the Kelly-Springfield Company and the White Motor Company.

The Philadelphia office of The Lincoln Electric Company, located at 401 North Broad Street, maintains a sales and service organization for all Lincoln products and supplies.

Pittsburgh Equitable Meter Co. Appoint Representatives

W. F. Rockwell, president of the Pittsburgh Equitable Meter Company, announces the appointment of E. B. Wilson & Company, 1600 Arch St., Phila., Pa., as their representatives in Eastern Pennsylvania, Eastern Maryland, Southern New Jersey and Delaware. As recent successors to Brown, Wilson & Company, representatives for the Nordstrom Valve Company since 1919, the firm of E. B. Wilson & Company will continue to handle Nordstrom Valves, and in addition, will represent the Emco Company in the sale of meters, regulators and leak clamps together with other EMCO equipment for the reduction of unaccounted for gas.

Personals

James H. Jourdan, President, Brooklyn Union Gas Company, who on June 6th completed 50 years with the company, was one of 144 men honored for long, faithful service at the company's eighth annual Service Emblem dinner on November 10th.

Approximately 600 employees and guests witnessed the presentation to Mr. Jourdan of a handsome emblem which noted his completion of a half-century with the company. The presentation was made by Vice-President Arthur F. Staniford, who himself was the recipient of a 50-year emblem a year ago.

James H. Jourdan

Mr. Jourdan was born in Brooklyn on December 11, 1864. At the age of seventeen (to be exact, on June 7, 1882), he went to work for the Gas Company as a laborer in the Street Division. Subsequently, he went into the Fulton Municipal Gas Company as an apprentice at the Works.

Although he left school at this early age, his education continued as he took special instruction from Professor Dodge of the Rensselaer Polytechnic Institute at Troy, and also from Dr. Elliott, chemist of the Consolidated Gas Company, and Professor Chandler, then of the faculty of Columbia University.

Mr. Jourdan rose rapidly in the ranks and in the course of time he was appointed Engineer of Construction for the entire Company. These duties were carried on in addition to those of Engineer of the Western Division. Later, he was made Chief Engineer.

In 1910 he was made Vice-President and Director of the Company, still carrying the title and the duties of Chief Engineer. In his capacity, he had charge of the rebuilding of the Metropolitan, Citizens', Nassau, and Williamsburgh Works.

Mr. Jourdan has been President of the Company for nearly twenty years and directs the handling of all rate questions, all legislative matters, and all financial undertakings.

Walter F. Perkins, who has been Manager of the Harrison, New Jersey, Works of the Worthington Pump and Machinery Corporation since 1927, has resigned to become Vice-President and General Manager of The Bartlett Hayward Company, Baltimore, Md., where he assumed his new duties December 1.

Walter F. Perkins

Mr. Perkins is succeeded as Works Manager at Harrison by Mr. Hugh Benet who was formerly Manager of Worthington's Holyoke, Mass., Works.

From 1914 to 1927 Mr. Perkins was associated with The Bartlett Hayward Company and held the position of Works Manager when he resigned to join the Worthington organization.

He is a native of Baltimore and is a graduate of Baltimore Polytechnic Institute, 1909, and Lehigh University, 1913.

R. M. Conner, director of the American Gas Association testing laboratory in Cleveland, Ohio, spoke at the monthly Technical Conference of the Brooklyn Union Gas Company on November 22nd.

Mr. Conner described the various kinds of tests conducted in the laboratory and explained how scientific research is enabling the gas industry to make rapid strides in the face of stiff competition. His talk was illustrated with slides.

George W. Curtis, superintendent of Camden Coke, (N. J.) Co., was recently honored by a group of his associates at a banquet. It was the occasion of Mr. Curtis' retirement after forty-five years of continuous service with Public Service and predecessor companies. Mr. Curtis had been superintendent of Camden Coke Company since the coke plant was built thirty years ago. He also enjoys the distinction of having supervised initial operation of the first "water gas" plant in the city of Philadelphia in 1890.

Attending the dinner were one hundred of Mr. Curtis' friends and fellow workers who have been associated with him for various periods during his career of nearly half a century in the gas industry.

Thomas K. Bishop was recently made president of the Wyoming Gas Company, succeeding the late E. A. Durham. Mr. Bishop has also been named director of several large oil and gas companies in the East, which represent a part of the Durham interests. Mr. Bishop had been treasurer of the Wyoming Gas Company for the past several years.

Mr. Bishop came to Wyoming in 1910, in charge of the E. A. Durham interests, and since that time has been manager of the several companies with which Mr. Durham was affiliated. These companies included the Greybull Refining Company, The Greybull Oil Company and the Big Horn Oil and Gas Company, all of which were sold to the Midwest Refining Company in 1919.

W. C. Feddersen, assistant secretary and accountant of the Wyoming Gas Company, has taken on the additional responsibility of treasurer. He succeeds Thomas K. Bishop who was named president of the company.

Addison B. Day, president and general manager of the Los Angeles Gas & Elec. Corp., Los Angeles, Calif., has been conferred a new honor with his election on October 27 to the Board of Directors of the Union Bank & Trust Company, Los Angeles.

F. B. Richards, for many years managing director of the Woodall-Duckham Vertical Retort & Oven Construction Company, has been elected chairman of the board of Woodhall-Duckham, Ltd.

Miss M. P. Richardson, superintendent of Home Service of the Ottawa Electric & Gas Companies, Ottawa, Can., has resigned her position upon her physician's orders. Miss Richardson had been in the companies' employ for five years. Miss Richardson also has a remarkable war record, having been matron on the nursing staff of the Army Medical Corps.

Horace H. Clark, formerly vice-president of the United Public Service Company, has become affiliated with the Central Fuel Corporation, 160 North LaSalle St., Chicago, Ill.

W. P. Schwabe, manager and director of the Northern Connecticut Power Company, now affiliated with Connecticut Light & Power Company, has been appointed a director of the Federal Home Loan Bank for the New England District, located at Cambridge, Mass.

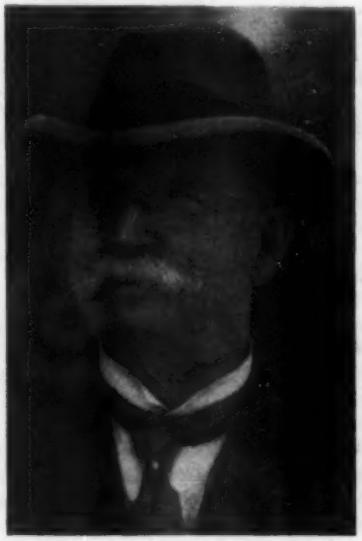
Blackwell Newhall, assistant secretary of the United Gas Improvement Company and various of its subsidiary organizations, has been named assistant to F. M. Milward Oliver, general manager, the Philadelphia Gas Works Company.

Mr. Newhall is a graduate of the United States Naval Academy. He first became associated with the U. G. I. in 1927, and was previously in the employ of the Philadelphia Electric Company as assistant power engineer. Mr. Newhall served as assistant to the vice-president in charge of finance of U. G. I. and in 1929 was made assistant secretary of the company.

Mr. Newhall will resign all of his other business connections in order that his full time may be devoted to the Philadelphia Gas Works.

Sterling Fyfe Hayward, the 86-year-old chief executive of the Connelly Iron Sponge & Governor Co., popularly known as "the Governor," started on December 1st for a three and a half months' trip around the world, visiting the following places:

Havana, Cristobal, Los Angeles, San Francisco, Honolulu, Yokohama, Kobe, Shanghai, Hong Kong, Manila, Singapore, Colombo, Bombay, Suez, Alexandria, Naples, Genoa, Marseilles and others.



Sterling F. Hayward

Mr. Hayward for nearly fifty years has been identified with the Connelly Iron Sponge & Governor Co., first as secretary and latterly as President, following the death of Mr. Wm. H. McDonald, its president for many years.

Mr. Hayward recently resigned as active head of the Connelly Iron Sponge & Governor Co., but continues to serve on the Board of Directors of this concern.

Mr. Arthur L. Smyly, who has held the position of Western General Manager for twenty-five years, was elected President.

C. S. Cronkright has been appointed Industrial Fuel Representative, Essex Division, Public Service Electric & Gas Co., Newark, N. J. This position was formerly held by H. Preston Morehouse, who was appointed General Air Conditioning Representative.

Hugh H. Cuthrell, Manager of the New Business Department, Brooklyn Union Gas Company, has been chosen as a director of the Kiwanis Club of Brooklyn.

Wallace G. Murfit was recently appointed commercial manager of the Philadelphia Gas Works Company.

Mr. Murfit has been in the United Gas Improvement Company's employ since 1902 when he started as an office boy with the Welsbach Street Lighting Company of America. He rose to the position of auditor of that company. From 1909 to 1927 he was chief clerk in the Philadelphia Gas Works' New Business Department, secretary and treasurer of the Bucks County Public Service Company, and assistant to manager of budgets, the U. G. I. Company.

H. Preston Morehouse has been appointed General Air Conditioning Representative of the Public Service Electric & Gas Co., Newark, N. J. This appointment was made in recognition of the growing importance of air conditioning as a new field for the utilization of both gas and electricity.

Mr. Morehouse became associated with the Public Service Elec. & Gas Co. as Industrial Fuel Representative, Newark District. In 1926 he was transferred to the Jersey City-Hoboken District in the same capacity, as Industrial Fuel Representative. Later, he was appointed Division Industrial Fuel Representative in Charge of House Heating, Newark District.

Mr. Morehouse was also a member of the committee which prepared the "House Heating Engineers' Manual." This handbook has had a wide national circulation.

Oscar H. Fogg, vice-president of the Consolidated Gas Company, was elected a vice-president of The New York Edison Company at a meeting of the directors held Tuesday, November 29. Col. Fogg is a director of the following nine companies of the Consolidated group: Westchester Lighting Company, Bronx Gas and Electric Company, Central Union Gas Company, Northern Union Gas Company, National Coal and Coke Company, East River Gas Company, Standard Gas Light Company, United Electric Light and Power Company, and the New York and Queens Electric Light and Power Company.

Herbert L. Zeigenbein has recently been appointed Assistant District Manager of the Saginaw district of the Consumers Power Company, Jackson, Mich.

Mr. Zeigenbein entered the employ of Consumers Power Company in 1921 in the Production and Transmission Department, as a Junior Engineer. In 1922 he was transferred to the Electrical Engineering Department and later assisted W. H. Sammis in power sales. For some time, Mr. Zeigenbein served as Power Engineer for the Jackson District. Later he did similar work in the Kalamazoo District. He was transferred to the Saginaw District in 1928.

Obituary

FRANK M. HETRICK

Frank M. Hetrick, 75 years old, Warsaw, Ind., for years manager of the Warsaw Gas Company, died recently at his home in North Manchester, Ind., where he had lived three months prior to death, which was due to paralysis and pneumonia. Mr. Hetrick was born in Ohio and settled in Warsaw when a young man. After resigning his position with the gas company, he moved to Beaver Dam, Wis., where he was engaged in utility managerial work. He later returned to Warsaw. He is survived by the widow.

REGINALD S. DOULL

Reginald S. Doull, special representative of the Utilization Department of the Consolidated Gas Company of New York, died at Bloomfield, New Jersey, on Friday, November 11. He was in his seventy-second year.

Mr. Doull was connected with the Utilization Department of the Company for nearly twenty years. During this time, he was the Company's representative on work relating to various city codes, and his expert knowledge of these matters won for him the respect and admiration of the municipal and other officials. He not only assisted in checking and reviewing all codes which affected the gas business, but he was also frequently called in for consultation on such codes.

Mr. Doull was an active member of the American Gas Association, and was known particularly for his work on the Gas Safety Code and for his services as A. G. A. Representative to the National Fire Prevention Association.

During his active years in politics, he lived in New York City and served as a member of the Board of Aldermen from 1899 to 1909.

Mr. Doull has been a sufferer from heart disease for several years.

WILLIAM G. VON GEMMINGEN

William G. Von Gemmingen, Consulting Engineer, who was active in the manufactured and natural gas industry for 20 years as both a consultant and operating official, died on October 17th at Eastland, Texas.

Born 50 years ago in West View, Virginia, he was the son of Baron Sigmund Von Gemmingen, who came to this country before the Civil War and married Miss Mary Webb, of Richmond, Virginia. He was educated at Rock Hill College and in Germany at the University of Gottingen.

After a year in charge of the construction of railroad bridges for the Lake Champlain & Moriah Railroad at Pt. Henry, New York, Mr. Von Gemmingen in 1910 accepted a position as construction engineer with Forstall & Robinson.

He also was associated as construction engineer and operator with the engineering company of Isbell Porter in Newark, N. J.

In 1918, Mr. Von Gemmingen was at the Baltimore plant of the U. S. Industrial Chemical Company engaged in research on the recovery of potash, glycerine, tar oils, gas and decolorizing carbon. He then joined the Aluminum Company of America and put in a new carbon and gas plant.

Joining Ford, Bacon & Davis in 1921, he was senior gas engineer for seven years, testifying in rate cases and hearings before courts and commissions for various gas companies; conducting valuations for the purchase of gas properties, making studies of markets, costs of construction, gas supplies and financing for numerous natural gas projects; making investigations of the introduction of natural gas in manufactured gas properties, and preparing designs and supervising construction of several natural gas undertakings.

For three years before establishing his own consulting engineering practice, Mr. Von Gemmingen was with G. E. Barrett Company as technical advisor on gas problems.

Surviving Mr. Von Gemmingen are his widow, a sister and four brothers.

R. A. WALLACE

Robert Alexander Wallace, Superintendent, Gas Division, Quebec Power Company, died on November 15th. He was sixty-four years of age.

He was born in Ireland in 1868, but was brought out to Canada at the age of six, when his parents settled in Hamilton, Ontario. He worked for a number of years for the Hamilton Gas Company, of which he became superintendent.

In 1906 he came to Quebec, as superintendent of the old Quebec Gas Company. In later years, when that company was united with the Frontenac Gas Company, Mr. Wallace carried on as superintendent of the merged companies; which later became known as Quebec Power Company, of which he was gas superintendent. He held that position up until the time of his death.

The deceased was an outstanding Free Mason and was a Past Master of St. John's Lodge, No. 3, A. F. & A. M., Quebec City; a past D. D. G. M. of the district of Quebec and Three Rivers, and was also an honorary inspector-general, 33rd degree, of the Supreme Council of Scottish Rite for Canada. The late Mr. Wallace was also an honorary past master of several other Masonic bodies.

Mr. Wallace is survived by his widow, Mrs. Grace Wallace; two sisters, Miss Frances Wallace and Mrs. G. Coddington, of Montreal; and two brothers, Hugh and Frank Wallace, also both of Montreal.

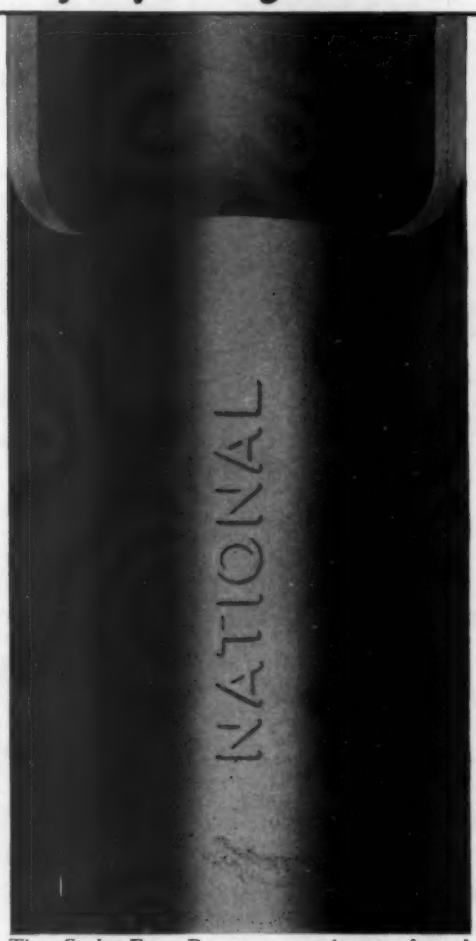
Economical pipe for Gas service

MINIMIZED CORROSION

Mill-scale is one of the principal causes of pitting; it is electronegative to the pipe metal and sets up galvanic action causing pitting around the scale areas; therefore, when the mill-scale is removed, longer life is obtained from the pipe.

CLEAN, SMOOTH SURFACES INSIDE AND OUTSIDE

—forming a better base for galvanizing or other protective coatings and finishes.



The Scale Free Process was invented and developed by National Tube Company and is applied to NATIONAL Pipe (butt-weld sizes ½ to 3-inch). This process, plus Spellerizing, makes NATIONAL Pipe different from any other pipe and recognized everywhere as the outstanding value in pipe for gas service.

NATIONAL TUBE COMPANY, Pittsburgh, Pa.
Subsidiary of United States Steel Corporation

FULL DELIVERY CAPACITY

—less friction loss, because there are no obstructions to the flow.

NO DAMAGE TO VALVE SEATS

—no clogging of small orifices, because there is no mill-scale left in the pipe to break off.

GREATER STRENGTH AT THE WELD

The additional rolling which scale free pipe receives, increases the strength at the weld approximately 20 per cent, making the pipe especially desirable for bending, coiling and special uses.

NATIONAL SCALE FREE PIPE
SPELLERIZED

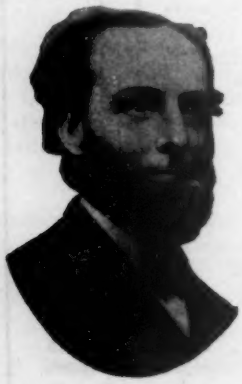
(All National Galvanized Pipe is given a special chromate treatment to resist discoloration and the formation of white rust. This patented process preserves that smooth, glistening surface or metallic luster characteristic of good galvanizing practice.)

TRADE NEWS

Seventy-fifth Anniversary of The Moore Corporation, Joliet, Illinois

"Seventy-five years ago, Alexander K. Moore and William N. Moore, Sr., founded a company, dedicated to the upholding of a newly created standard of quality in the manufacture of stoves. It was then believed—and time has proved it true—that this policy, as laid down in 1857, was one of service which the public would respect and such as would profit the industry most."

Behind this simple statement which prefaces the catalogue of The Moore Corporation, Joliet, Illinois, lies a background of industrial history which is as unique as it is romantic.



Alexander K. Moore

In the year 1857 the founders of the company went to Neenah, Wisconsin, from New York and there began the manufacture of stoves under the firm name of Moore and Brother. The first stoves were made in late 1857 and were delivered to their destinations by bobsled. The original foundry was a two story frame building, covered a grounding space of forty by sixty feet.

In 1870 a new stove foundry was established at Joliet, Ill., and in 1873 the Neenah plant was sold. The new foundry was called the Solar Stove Works and later the Joliet Stove Works. In 1906, it was changed to Moore Brothers Company, and this year became The Moore Corporation.

Since 1884 Mr. Lewis Moore, Sr., now President of the Company, has been actively associated with the business in many connections and much of its progress has been due to his wide fund of knowledge and experience in the industry. His son, Lewis Moore, Jr., has also been connected with the company for some time in the capacity of Vice-President and Secretary. Many other officials, now active in the concern, have long records of service, notably, Mr. F. E. Wright, Sales Manager, and Mr. G. E. Gowey, Superintendent.

This record of three-quarters of a century under the same family management, without any cessation of business, is one with few equals in business history.

The Moore factory and sales offices are located at Joliet. The factory occupies a space of more than nine acres and contains machinery and equipment which are up to date in every respect. Gas-fired equipment is used throughout the plant. The Moore Corporation manufactures a complete line of cooking and heating appliances sold under the trade name of "Moore's."

William N. Moore, Sr.

In 1888 Moore's made the first enameled stoves sold in this country. The parts were made here, then shipped to Germany for enameling, for no porcelain enameling suitable for stoves was done in this country. The parts were returned for assembling and completed stoves were known as the Moore's "Fidelity." They were shown at the World's Fair in Chicago in 1893.

In 1891 Moore's originated the warm air circulating heater, Moore's Original Air Tight Heater. This stove was designed to circulate warm air and was sold with a promise that it would heat several rooms. Moore's also contributed many other features to the betterment of cooking and heating appliances. They introduced the double duty burner in gas ranges which combines in one unit a high duty and low duty burner controlled by one valve. They invented the glass oven door for ranges in which the first heat resisting malleable glass was used. They designed and patented removable oven door linings and panels in ranges. They designed and introduced the first partitioned utility drawer for gas ranges. They originated and developed the anti-carbon fire pot for coal ranges and heaters and the heat controller-damper for ranges. They designed and built the first steel cook stove.

Johnson Gas Appliance Co. Announce Change of Address of Their New England Representatives

The Johnson Gas Appliance Co., Cedar Rapids, Ia., announced that the office of their New England representatives, R. M. Henshaw Co., Boston, Mass., have moved their offices to 221 Columbus Ave., Boston, where they have warehouse facilities, and a display room. Mr. Webb Sherman was added to their sales force in October.

Robertshaw Display Helps Range Sales

An ingenious display piece, designed for use in window trims or floor displays, is being offered to all dealers handling gas ranges equipped with the Robertshaw "AutomatiCook" oven control. This display is especially suited for placing on the range so that it calls attention to the Robertshaw oven control.

As the Robertshaw is now standard equipment on more than one hundred well known brands of ranges, this display can be used by almost every dealer selling gas ranges. It is large enough to be an effective eye-catcher wherever placed, but it is not a cumbersome display and may be used repeatedly.

The oven control is one of the first features that a woman asks about when she looks at a range in this modern age. For that reason, this display becomes a real sales maker for it tends to focus the interest of women customers as soon as they enter the store or display room. Automatic oven control has been one of the chief factors in accelerating the obsolescence of old ranges and creating an active desire for new range ownership.

Since the Robertshaw has been available to the gas range industry, more than a million, seven hundred thousand Robertshaw equipped ranges have been sold. The enthusiastic approval of these actual users, supported by national advertising and aggressive dealer co-operation, has made the Robertshaw one of the most sought after features in modern gas range construction.

The display will be promptly supplied without charge by addressing the Robertshaw Thermostat Company, Youngwood, Pa., mentioning the number of displays that can be used to advantage. As it is a display that can be used throughout the new year, it is a good idea to write for it now as a first step in preparation for an active range business in 1933.

SUPERIOR

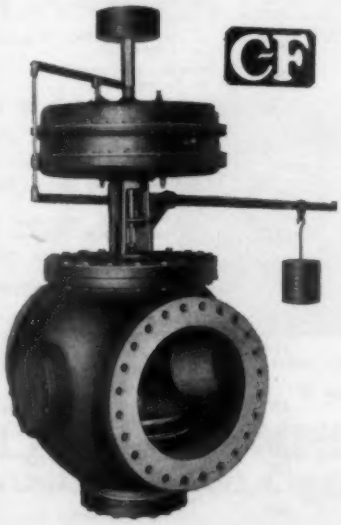
Gas Meters
Provers
Service Cleaners
Diaphragms
Repairs

SUPERIOR METER CO.

167-41st Street
Brooklyn, N. Y.

The Utmost Delicacy of REGULATION

A HIGH and variable inlet pressure can be reduced to a low and unvarying outlet pressure by the specially designed and precisely made Fulton Duplex Sensitive Gas Governor. A mixture of natural and manufactured gas can be controlled with extreme accuracy and with perfect assurance. Frictional surfaces reduced to a minimum, diaphragm area extraordinarily enlarged, and non-corroding materials scientifically adapted to their use, account largely for the success of this dependable appliance. Extremely simple. Easily and quickly installed. No accessories to give trouble. Ask for full description.



The Chaplin-Fulton Mfg. Company

28-40 Penn Ave. **Pittsburgh, Pa.**

REPRESENTATIVES:

WESTCOTT & GREIS, Inc. *Sales and Service* Dallas—Tulsa

HIMELBLAU, AGAZIM & CO. 228 N. La Salle St. Chicago, Ill.

C. H. COLLINS 628 Dwight Bldg. Kansas City, Mo.

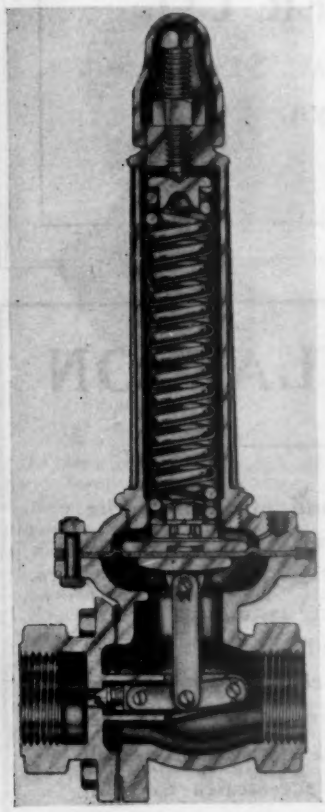
Or Any Jobber

Fulton Duplex Sensitive Gas Governor

UNVARYING PERFORMANCE—

High Pressure to Low, One-Half Ton Pressure to Small Volume delivery for combustion purposes, demand one thing above all else—unvarying performance. Of course, it is easy to claim superiority for a product but Reynolds, because they know the technical nature of the gas control field, refrain from making claims. The enviable record their Regulators have made establishes any claim to superiority. For Forty Years Reynolds have built Gas Regulators. The increasing volume of business attests the popularity and acceptance of their products as dependable. The hundreds of thousands of Regulators giving satisfactory performance today is the proof that they give unvarying performance over a length of time and that they are economical.

The Reynolds Engineering Staff is always glad to co-operate in working out and building units to meet the demand. Write for details.



Left — Cross-sectional view of Reynolds New ½ Ton Regulator designed with ample factors of safety. This Regulator handles pressures up to 1,000 pounds, reducing same to pounds.

The two extremes in the wide range of pressures controlled by Reynolds Gas Regulators.

Below — Low Pressure Spring Type (also Dead Weight), Regulator. This type of Regulator is delicately balanced to deliver required volume.

• REYNOLDS BRANCH OFFICES: 422 Dwight Bldg., Kansas City, Mo.; 2nd Unit, Santa Fe Bldg., Dallas, Tex. • REPRESENTATIVES: Eastern Appliance Co., Boston, Mass., F. E. Newberry, Avon, N. J.

REYNOLDS GAS REGULATOR COMPANY

Anderson, Indiana, U. S. A.

GAS CONTROL SINCE 1892

TRADE CATALOGS

Published by manufacturers of Gas Equipment and Appliances for you. Order by number, using coupon on Page 56.

PLANT EQUIPMENT

"AMERICAN" GAS AND METER TESTING APPARATUS
American Meter Co. 320

AUTOMATIC GOVERNORS
Connelly Iron Sponge & Governor Co. 289

BALANCE GOVERNORS
Connelly Iron Sponge & Governor Co. 290

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The Bartlett Hayward Co. 701

B. H. CO. THICKENER
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B. H. CO. VERTICAL SCRUBBER
The Bartlett Hayward Co. 57

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THROTTLE GOVERNORS & COMPENSATORS
American Meter Co 734

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Lux Material

Guaranteed to always run uniform. It has been used by Gasworks all over the world for nearly 50 years. We offer same from a shipping point most conveniently located to your works. Shipped in bulk or bags.

Lux-Sponge
THE PERFECT READY MIXED OXIDE

For Gasworks having no facilities to mix their own Sponge we offer our celebrated "Lux Sponge," guaranteed efficient for Coal or Water Gas.
Samples upon request.

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THE ALPHA-LUX COMPANY, Inc.
192 FRONT STREET - NEW YORK CITY, N. Y.

Philadelphia Office: 2767 Gaul St.

ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P C

Manufacturers of All Kinds of Gas Apparatus

NEWARK - NEW JERSEY

LEADING GAS COMPANIES USE LAMBERT METERS

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
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Pumps
Calorimeters
Wet Meters
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LAMBERT METER CO.
BUSH TERM. BLDG. 4, BROOKLYN, N. Y.

Byllesby Engineering and Management Corporation

Wholly-owned subsidiary of

Standard Gas and Electric Company

231 South La Salle Street, Chicago

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ECONOMY

Medium-size, high-pressure meter, fitted with P. V. T. T. Recorder.

An oil-gas plant in the Southwest had for years estimated their "unaccounted-for" at 15%, but the recent installation of a Connersville Meter proved it was actually above 35%.

They have since reduced their actual "unaccounted-for" to 16%.

In addition to this very considerable saving, the operators, knowing their make, have succeeded in reducing their oil consumption about 10%, and are making gas of uniform 550 B.t.u.

This experience is merely typical of many advantages to be gained from the installation of Connersville Meters.

Bulletin 40-B10 gives full descriptive details. It will be gladly sent upon request.

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WILBRAHAM

12th & Columbia, Connersville, Ind.

New York
Chicago
Pottstown, Pa.

St. Louis
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San Francisco

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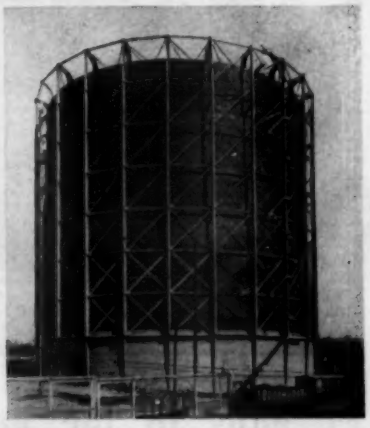

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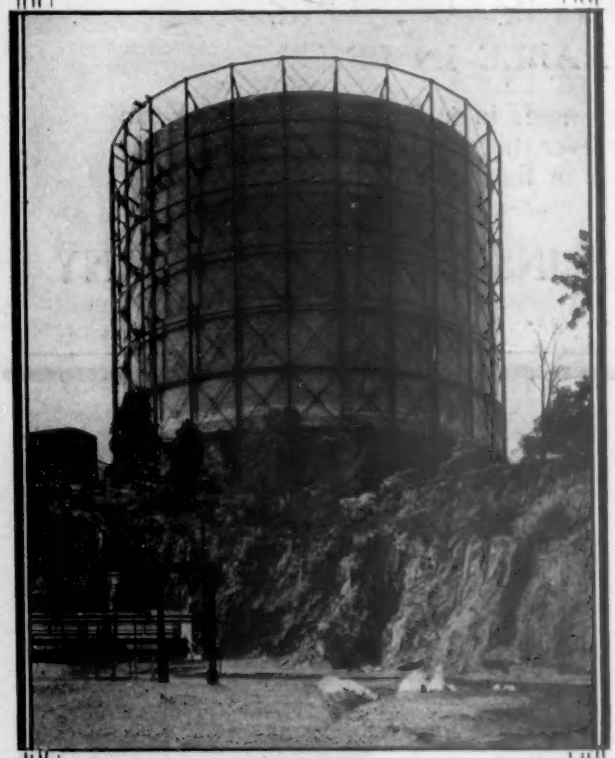

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MAINTAINING OUR *OBLIGATION* TO OUR READERS

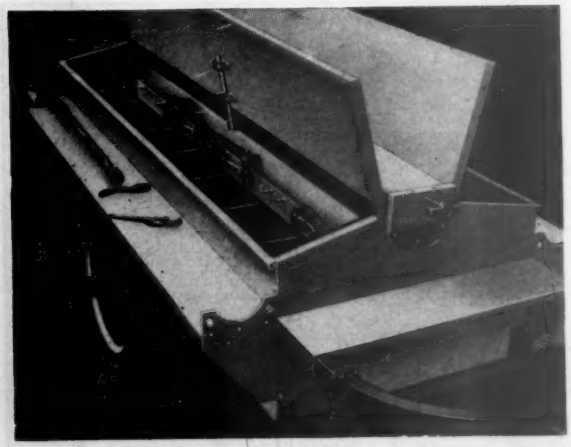
During the past year our industry has suffered losses in common with all other utilities—gas, electric, railway, etc. It has been a period that has caused all to carefully analyze the various problems and endeavor to cut out extravagance in operation and at the same time keep up or increase the efficiency of the manufacturing, distribution and sales departments of the company.

In recognition of this, the American Gas Journal has during the past year endeavored to give the industry through its editorial pages material of the most practical kind to help all branches of the industry solve their problems. Like every other company and individual we have had to overhaul our plan of operation, but the one department where expense has not been curtailed, is the gathering of practical editorial material.

It is our plan to continue this policy for the coming year, and as new problems arise, to procure the best authoritative material dealing with them for the benefit of the gas industry.

AMERICAN GAS JOURNAL

53 Park Place, N. Y.



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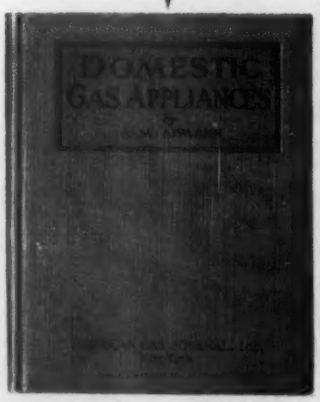

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